

Briefing

Atkins bureau taken over by US firm

AS predicted (CW, July 21), Atkins Computing Services of Epsom has been taken over by the US time sharing bureau On-Line Systems Inc. OLS is to pay £1.1 million to the bureau's parent, the W. S. Atkins group, partly in the form of 32,000 OLS shares which will make W. S. Atkins one of the largest shareholders in OLS.

The existing OLS subsidiary in the UK, based in North London, will be merged with the Atkins Computer Services operation to form a joint subsidiary with headquarters in Epsom.

System X plans

THE first System X telephone switching contracts are expected to be placed by the Post Office within the next month. One proposal being considered is that the project should be controlled by a company jointly owned by the three main contractors, GEC, Plessey and STC.

Link decision

A DECISION on whether to stay with Univac or go over to IBM for mainframes to handle its planned online network is likely to be made by the Union Bank of Switzerland by the end of this year. UBS is currently studying the relative merits of converting its Univac 494 based software to Univac 1100 or IBM 370.

Four-day week

AFTER making a loss of more than \$1 million in the first nine months of its 1977 fiscal year, Calcomp has put most of its employees on a four day working week. Calcomp president George Canova, stressed that this will not affect production on the disc drive and graphics involved. Calcomp employees in the UK and Europe will continue working five days.

After System 3...

IN just over a year from now the IBM System 3 range could be completely superseded by the Series 30 family following the introduction of the System 36 which is expected to be a powerful database management system that will replace the System 3 Models 12 and 16.

The micro revolution

The microprocessor is one technological development that is having a genuine revolutionary effect upon the market. In this week's survey Martin Banks, CW's new microprocessor correspondent, looks at the new arena into which these devices will take computing. Alex d'Agapeyeff and Martin Halsey consider the impact on the CP department and on business systems respectively, and the home brewed scene is reviewed by Quentin Scott. Pages 11/14

University College switches from mainframe to minis

A BREAK with the tradition of having a central mainframe to provide a university computing service is being made by London's University College, which is to replace its 10-year-old IBM 360/65 by six linked minicomputers.

And the decision could mean a prestige order for GEC, because the UK manufacturer is one of the three companies bidding for the order. The other two are the US firms Digital Equipment and Prime. The GEC machines being offered are 4082s.

The acceptance of University College's

latest proposal, at a meeting of the Department of Education and Science's Computer Board last week, brought an end to 18 months of indecision.

The college originally chose a 370/168 and later modified its choice to a 370/158. It was encouraged to buy British, so changed to a 2080.

The Computer Board agreed that a large 2000 was needed in London University but had already pencilled in Queen Mary College as the likely site, possibly with a Distributed Array Processor.

This led to the unusual move of installing a network of minicomputers instead of a single mainframe.

"We decided that this approach was the most cost-effective as we have such a wide range of users," said Chris Kennington, head of the systems group at University College. "We do everything from text processing to economic modelling. We expect to support a very large number of terminals, as many as 150 at a time."

Kennington said the minicomputers would probably be installed together at

one site. This would allow very high speed communications between processors and also make maintenance easier as one machine could be taken out of action and the others reconfigured.

The first minicomputer will be installed by the end of the year so that software development can begin. Up to six are expected to be installed within two years. The college will remain a user of the big University of London Computer Centre and a lot of its purely IBM applications will be transferred to the 370s at Cambridge and Newcastle.

PROCUREMENT POLICY

Govt snubs Neddy's advice

THE Government has ignored recommendations from the National Economic Development Office's Computer Sector Working Party for an extension of the procurement policy to cover minicomputers and peripherals in the whole public sector. This move was reported exclusively in Computer Weekly (CW, July 21).

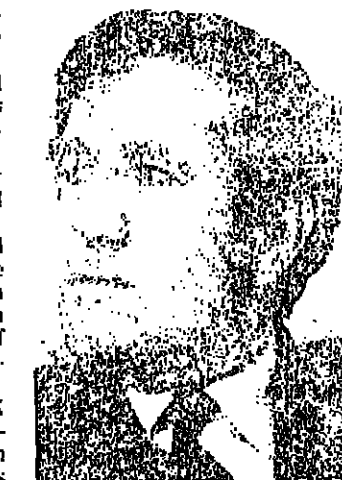
The new policy, announced in Parliament last week by Civil Service Minister Charles Morris, is virtually a continuation of the existing policy with single tendering applying to mainframes from the ICL 1904S and 2960 upwards in central government, including universities. Local government and nationalised industries are asked to "take note" of the policy.

Morris, however, left the door open for multi-mini configurations, such as that approved this week by the Computer Board for University College, London (see above), by saying, "The policy does not commit the government to purchasing a large computer within the defined power range where it would be more efficient to meet a particular requirement by a system made up of smaller machines."

Morris also stressed the "important proviso" that single tender orders will be "subject to satisfactory performance and delivery dates."

This emphasis is understood to have been influenced by current studies of government contracts being undertaken by the Committee of Public Accounts.

The bank has three IBM 370/168s recently upgraded to 168-3s, at its Zurich headquarters.



Charles Morris... "government is ready to co-operate in any co-ordinated European approach to public procurement."

Turn to page 2

IBM partner picks 470

DEALING a blow to IBM, Amdahl has just installed a 470V/6 mainframe with one of IBM's two partners in the Satellite Business Systems venture, the Aetna Life and Casualty insurance company. Aetna Life has installed the 470 alongside a complex of IBM 370/168s in Hartford, Connecticut.

Meanwhile, the next European installation and the fourth bank customer for Amdahl, is Credit Suisse, which claims to be Switzerland's oldest big bank.

The bank has three IBM 370/168s recently upgraded to 168-3s, at its Zurich headquarters.

IBM's most prestigious banking customer so far is the US Federal Reserve Board, the equivalent of the Bank of England, which has just installed a 470V/6 in Washington. The other Amdahl banking customers are Bank of Montreal and one of the major New York banks.

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IFIP delights

The often staid halls of IFIP will be livelier up later this month when some of the razor-sharp from the MCC is transported over the 48th Parallel from Dallas to Toronto. Heah Wiener gives a foretaste of some of the delights that the audite delegates may enjoy. Page 4

IBM reveals all

The attitude of IBM to its rival systems software developers seems to be changing. The company invited several such firms to a

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Unions threaten action in ICL pay dispute

INDUSTRIAL action has been threatened by the unions involved in pay negotiations with ICL unless the company makes an improved offer on a proposed self-financing productivity scheme by August 8.

A joint national meeting between APEX, EESA (Electrical and Engineering Staff Association), ASTMS, ACTSS (Association of Clerical, Technical and Supervisory Staff), and ICL was held last week, in which the company reiterated that it was willing to make an offer within Phase 2, backdated to July 2.

It also proposed a bonus scheme linked to profit/turnover dependent on profit in 1977/78, and not calculated on turnover alone as under the 1975 pay plan.

According to a spokesman for ASTMS, "the payments would be relatively low, according to the company less than one per cent on basic salaries on the proposed profit for 1987/77, and no payment would be made until June, 1978. This was rejected by the unions."

The unions then asked that the self-financing scheme should be introduced with "improved payments" from August 1, 1977, as allowed by the Government White Paper.

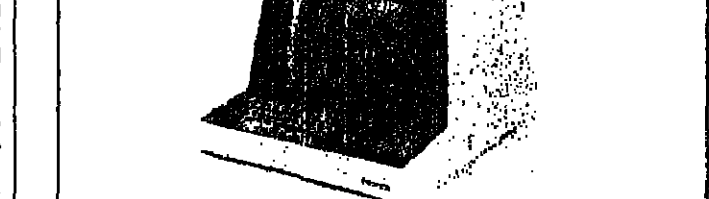
But according to the unions, no further offer has yet been received, and they are now strongly recommending that industrial action be taken unless ICL makes an improved offer.

NCR's advanced architecture

A LARGE degree of compatibility with international standards, is the principal feature of a new network architecture announced by NCR.

Called NCR/DNA, Distributed Network Architecture, it is designed to consolidate NCR's dominant position in the retail systems and funds transfer markets. In contrast to IBM's NSA, control is distributed

throughout the network. A main element of DNA Data Link Control, which bit-oriented and similar to both the ANSI ADCCP and the IS HDLC protocols. Compatibility with other vendors' equipment conforming to these standards and also to IBM's SDLC will be provided. DLC also provides interface to the CCITT X packet-switching interface.



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COMPUTERVIEW

Too much pure R— and too little practical D

ONE of the first tasks of the Hedor workshop on R&D was to try to compare the amounts spent on research and development in Britain and the rest of the world.

This proved to be difficult because of the lack of coherent and comparable statistics, but it was generally agreed that less was spent in the UK than in other countries.

And, although the British inventive genius had achieved many computer breakthroughs, it was felt that the major British R&D problem was that there has been too much pure and misdirected R and too little practical and successful D.

In the UK it was calculated that direct R&D spending on computer-related development in government-sponsored bodies, industry and the universities was less than £20 million in 1976.

This includes projects sponsored by the Science Research Council, Computer Systems and Electronics Requirements Board, the National Physical Laboratory, ICL, GEC, etc.

Yet this does not include, for example, the NEB's Inspec computer services company which has £20 million available to it, some of which would undoubtedly go into developing new ideas and products.

Outside the UK, R&D figures include areas that are not covered by the UK figures. The lack of quantifiable comparable statistics, however, could not hide the fact that most people believed that Britain was lagging behind the rest of the world in the resources devoted to R&D, and that money spent in the UK has often been dissipated on irrelevant research work, or else good research has not been adequately exploited.

In defence of British R&D, it was pointed out that, although the British government gives far less to ICL than the money given to the local computer industries by the French, German and Japanese, ICL is still more successful than its European counterparts.

But, as one delegate said, "How much better could ICL

Hedcor Workshop: 3 Research, development

Last month's ACM/Computer Weekly conference held at Hedcor Park included a number of workshops examining issues relevant to the conference's overall theme, Can computers save Britain? (CW, July 14).

This week Computerview summarises the workshop, which looked at computer-related R&D in the UK.

have been if it had even more support."

In universities it was pointed out that money allocated for research is often spent on buying a computer, which led on to questions about the best way of controlling research work to ensure it is being of most benefit to the nation.

Although a closer relationship between universities and industry could be beneficial, such as the way in which work at Manchester University helped to produce a bubble memory system for Plessey (CW, November 1975), this could create difficulties.

Researchers should have some degree of freedom away from commercial pressures, and the movement of individuals between university and commercial environments, while having many attractions, could create problems over career development.

It was felt that there should be a clear separation of research from development and that, while there should be some orientation of research to areas of more relevance to commercial needs, university research should not become subservient to industry's short-term needs.

Reflecting the general concern of the conference about the lack of awareness outside the computer industry of the importance of information technology, it was deeply regretted that for the 1976/77 financial year the SRC budget for computer sciences had been cut by about one-third in real terms, more than any other sector.

However, the SRC project for encouraging university research into distributed processing was

seen as a step in the right direction (CW, April 28).

Moving away from the inadequacies of existing R&D problems, in which it was continuously stressed that too many computer developments had suffered a "conceived in Britain, made elsewhere" R&D cycle, the workshop tried to pinpoint areas on which to concentrate in the future.

It was agreed that it was most probably too late now for Britain to develop any major semiconductor manufacturing capability, but that a useful area of R&D would be in developing systems development software for micros.

Britain should also not wear chauvinistic blinkers and should

look for co-operative ventures, particularly with Europe but not excluding the US and Japan.

The workshop concluded that in future more money should be invested in relevant research and development, although it did not come to any watertight definitions how to define "relevant."

The areas to be sponsored should include: Networks, distributed computing, terminals, peripherals, programming methods, design aids, application systems based on minis and micros, semiconductor products, the development of big machines, system architectures, bubble memories, man/machine interfaces and the effects of computers on work and social environments.

While these topics cover a wide area, the workshop believed that Britain should not pretend that it can compete at the top level in all areas, but should concentrate on the skills-oriented activities at which it is so good, while building up manufacturing and marketing capabilities in other areas, often in partnership with other countries.

FOCUS

on how to survive in a blackout

LAST month's blackout in New York served as a timely reminder to the UK DP industry: there is no substitute for independent power supplies.

In New York, it was not the computer centres which went down; it was the organisations themselves which had to shut down.

The Computer Weekly report from Hesh Wiener highlighted the drama (CW, July 21). Whilst the computer industry switched to alternative power supplies with barely a missed pulse, the rest of New York was not so fortunate. Pulses were racing in an endeavour to survive in an environment lacking in the necessities of life. No lifts, lights, air conditioning — or work.

For DP installations, survival was keeping the tapes loaded and printers running. No doubt this dedication was a great comfort to the respective companies. At least it made a welcome change: normally it's the computer side which has problems in serving the company. Statistics have yet to be compiled on how many MDs commanded the DPMA's offices during the crisis.

The impact in the UK was cool and calm. It would take more than the unexpected closing of one link of the data network to ruffle those involved in international communications. They have long learnt to keep close at hand a wall calendar. Routing operators have to be flexible. The odds are heavily stacked against Paris, Milan, Frankfurt, Tokyo and New York, all being online at any one time. Alternative routes can be set up at the flick of a channel controller.

Unfortunately the UK DP industry is not so well prepared for calamities on the grand scale. Back-up resources are still regarded as a benevolent luxury. Results from a power failure are predictable.

The operator regards the shutdown as an opportunity for improving his darts.

throwing prowess or a spot of motor-cycle maintenance in the yard. The glint of overtime payments radiates from all operating personnel.

For the DPM, it is a heaven-sent excuse for late delivery of workloads for the next month or so, especially if the system went down mid-application. His first action could well be to dictate a series of early warning memos to all user departments.

The programming team resigns itself to an even longer wait than scheduled for those urgent test runs. Early afternoon shopping routines are substituted for late-night versions.

The user curses all in sight and thinks lovingly of the days when the worst that could happen was a shortage of ink or an epidemic of flu.

The managing director calls on the chief accountant for a full and frank report before consoling himself on the golf driving range.

All this could well be avoided by the simple expedient of installing a standby diesel generator. Just why the DP industry neglects the obvious is baffling. Back-up routines dominate DP operations. Off-site storage centres are all the rage. Com-

Ten years ago...

COMPUTER WEEKLY AUGUST 3, 1967

THE English Electric 450 was to be the first microcircuit computer system from the West officially to reach Russia. It was ordered for the Moscow HQ of the State Committee of Supply and was to handle central planning for allocation of orders throughout the country... An ICT 1907E was ordered by the Ministry of Defence, to be used for the solving of operational research problems, the simulation of military operations and the evaluation of war game projects... The Post Office Bill, to authorise the setting up of a national data processing service by the GPO, became law... Studies on the possibility of computerising job finding at employment exchanges were conducted by the Ministry of Labour... Government research and development expenditure on the design, production and application of computers in Britain in 1966-67 was about £4 million, said a MinTech spokesman in Parliament... The installation of ICT 7013 data transmitter/receiver links between Canberra and Sydney was the first stage of a nationwide data transmission network for the Australian armed services... A Ministry of Health committee was set up to consider the need for a standard medical computing language.

Coal Board in talks on Soviet link-up

TOP officials from the National Coal Board's computer bureau, Compower, were in the USSR last week talking over the possibility of collaboration on computing in the mining industry.

Bob Hitchcock, Compower's managing director, and his deputy, George Bannerman, reached tentative agreement on a number of unnamed projects which will be considered at a meeting of the NCB's collaboration committee next month.

Compower is also talking to leaders of the Polish mining industry.

Collaboration could be good for ICL, as many of Compower's systems run on ICL mainframes. Compower is in close contact with ICL and

has worked with the company in projects with the Hungarian mining industry.

The discussions with Poland and the USSR were just one aspect of Compower's international activities over the last year, recorded in the NCB's annual report.

Visits were made to several Middle Eastern countries with the aim of selling training services (CW, October 16, 1975).

Compower's turnover rose by 21 per cent to £12.8 million during the year. Profit was up 14 per cent to £2.5 million. External bureau business rose by 36 per cent, but 65 per cent of Compower's business still comes from the NCB.

Post Office attacks £100m profits rebate

THE Post Office has criticised the Price Commission's requirement that it should pay back over £100 million of its telecommunications profits in the form of a £7 rebate to each telephone subscriber.

For the year ended March 1977, the telecommunications services contributed a profit of £365.4 million out of a total profit of £392.2 million.

Commenting on the enforced refund of profits, the Post Office's annual report notes that during the year investment in telecommunications totalled £835 million.

"To fund such programmes entirely by large loans would place unacceptable demands on public sector borrowing and produce a heavy interest burden on telecommunications finances."

"There is no realistic alternative to funding the greater part of the needs from internal sources if the nation wants telecommunications services that will match the best in the world."

Telephone budget accounts likely by 1980

BUDGET accounts for telephone subscribers could be one of the new facilities provided by the ICL 2970 systems taking over the Post Office's telephone billing workload by 1980.

The three 2970s were ordered two years ago (CW, July 31, 1975) and are to replace 11 ageing Leo 326 systems. The first to go operational will be at Edinburgh where it will generate on a trial basis for Middleborough area subscribers.

The bills produced by the 2970 contain much more information than could be provided by the overloaded Leo machines, and include the opening and closing meter readings and the number of credit units, as well as the number of units being charged for. The bills also show the number of units clocked up during meter testing.

"It is for these compelling reasons that the Price Commission's requirement to make reductions amounting to £101 million to customers was such a disappointment throughout the Post Office," said the report.

It added that the money would have to be recovered sooner or later either by high prices or increased borrowing.

Telecommunications turnover during the year rose 22 per cent to £2,658 million, and the profit, as revised by the Price Commission, represents almost 10 per cent of turnover.

The National Data Processing Service had a profit of £1.5 million, up from £1.3 million last year, on a turnover of £38.9 million. However, since about 90 per cent of its work is done on behalf of other divisions of the Post Office, its profitability is a function of the Post Office's internal accounting procedures.

In 1975/76, the Post Office made a profit of £147.9 million, while in the previous year it made a loss of over £300 million.



Burroughs wins \$3m Turkish trade

With orders for two 88800 large-scale mainframes, Burroughs has scored a significant breakthrough in the Turkish market. In addition the company's local distributor Koc-Burroughs Ticaret AS has won a contract from the government for a £3700, and the total value of the three deals is over \$3 million.

The biggest order comes from Hacettepe University in Ankara, which already has a \$3500, installed in 1969. It is getting a \$1.5 million 88800, to be used for administration, student records, research projects and training. A link to the \$3500 is planned.

The other 8800, worth \$1 million, is going to Turkey's largest domestic appliance manufacturer, Arcelik AS, also a \$3500 user. In this case the new machine will replace the 3500. Installed in 1970, and will run Burroughs' Production Control System II software package.

The government order comes from the Exchange and Audit Department, and the \$650,000 order was won in competition with four other manufacturers.

Z8 micro in UK by end of year

THE full specification for the Zilog Z-8 single chip microcomputer will be available in the UK next month, with first samples scheduled for this country by the end of the year.

The device will have 2K bytes of ROM and 96 bytes of RAM on board and has been designed for a maximum execution time of 750 nanoseconds. Equipped with four 8-bit I/O ports and one serial I/O port, it also includes two timer/counters and a pre-scaler for real time control. Power requirement is a single 5V supply.

"Although not the first to market a single chip unit, Zilog president Dr. Frederick Faggin claims that the Z-8 will lend itself to a variety of systems open to others. One of the key systems areas the company is looking at is data processing, where the device will form the basis of equipment such as intelligent peripherals."

Computers as a creative medium

A GROUP of people who already run a community farm and a theatre group, are trying to introduce computing to one of London's most run-down areas as a community resource for adults and children.

The Vauxhall Media Project aims to find meeting places such as libraries and church halls and provide facilities for computing, film-making, photography and printing in Lambeth, an area of council housing, high unemployment and with a big problem of truancy among schoolchildren.

The project group has already produced an hour-long film about facilities for the homeless in the area, and a collection of poems by local people. Now it is working out its computing plans.

"We want to see if computing can be brought into the community as a tool and a medium for creative entertainment," said Peter Fotheringham, one of the organisers. "We hope to attract people who would

not usually have anything to do with computers and to dispel the image people have of them of being harmful."

In addition to Fotheringham, who is an actor in the theatre group, the organisers include people who work with computers at London University, and there is a possibility that computer time at the university might be made available five nights a week for the project.

The organisers hope to get a microcomputer for use both as a terminal and for running programs locally, and are also appealing to companies for old, working hardware.

Anyone wishing to help the project with information, advice, practical help and participation and equipment can contact Peter Fotheringham at 132 South Lambeth Road, London SW8.

DPMA survey on PO plan

A NATIONWIDE survey of DP managers is to be conducted to try to determine the future technological needs of the DP industry.

The survey will be conducted by the Data Processing Management Association in conjunction with the London-based communications specialists Langton Information Systems.

The survey is in response to an invitation from the Carter Post Office review committee to comment on its recent proposals.

Sharp drop in sales

A BIG drop in exports led to a marked decline in total sales by UK computer equipment manufacturers in the first quarter of 1977, according to Dol figures.

Sales in the first quarter of 1977 were worth £199 million. This is up on the £184 million for the first quarter of 1976, but well down on the £222 million for the fourth quarter. The decline covered most products, including mainframes where sales fell from £46 million to £38 million.

Mainframe exports fell marginally from £22.6 million to £20.3 million but peripherals exports fell from £48 million to £38 million. The total exports fell from £91 million to £75 million. Imports also went down, from £177 million to less than £165 million. Export and import figures for the first quarter of 1976 were \$17 million and £107 million, respectively.

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by Chad

There's no business like US show business

IF YOU have never been to a major computer exhibition in the United States, there could be one thing at IFIP that you cannot adequately prepare for: American showmanship. And Toronto is just close enough to the US, culturally as well as geographically, to become the first show to which Americans will export their amazing promotions.

At the National Computer Conference in Dallas, visitors from abroad, even the jaded journalists, were startled by what they saw. Many of these roving reporters thought they had seen it all at the Hannover Fairs, the SICOBs and the Compoes.

But they hadn't. US companies attend European exhibitions all the time, but they try to adopt the ways of their hosts. They see no point in emphasising the foreign origin of their products in this nationalistic world. Americans are also a culturally insecure lot, easily hypnotised by crumbling old buildings and ancient social eccentricities.

In Dallas, the Americans were American. They insisted on having fun as they relayed that old message to the crowd: buy, buy, buy!

Had you been in Dallas, you might have seen Sherry the comedienne, Eddie the cardsharp, or April Tatro, America's only front-bending contortionist. You could have ogled the MFE pin-up girl or, were you a pundit of the Press Corps, sashayed off to the Basic Four rodeo.

Sherry Moreau is a perennial feature of ICC/Milgo's exhibits. She is probably the most valuable marketing asset acquired by Rascal when they bought out the company. Her skills, played out on a tiny, prop-ridden stage, are written by ICC's advertising director.

Rich Nathanson. The scripts are superb, but they really work because Sherry's energy, charm and talent for ad libs have won the hearts and minds of show-goers.

Others have tried to imitate Sherry's act; they have all failed. One frustrated competitor even tried to snipe at her with a nasty advertising campaign. It has backfired. People only became more aware of Sherry's clout and, implicitly, that of her sponsor, ICC.

Eddie the cardsharp works for Datum, a manufacturer of peripheral equipment. His legerdemain act, mixing magician's patter with corny but memorable comments about his employer's wares, is fascinating. His message, which reaches an audience that has been exposed to too many vendors' claims, is that technique counts.

Beauty was the word at MFE, which makes cassette drives. Its small stand was graced by a stunning model, rumoured to have been a Playboy magazine pin-up. Sadly for MFE, cheesecake turns off as many women's-liberated Americans as it turns on. It is also not very effective. This writer had to consult his notes to determine the model's sponsor, and cannot recall her name either.

From a marketing viewpoint, you might say the whole idea was a bust. The most memorable event at the NCC was not a public show, but a private party held by Basic Four, the small business system people. They invited the Press to a ranch where the otherwise sedentary journalists participated in a rodeo.

The newsmen got closer to cows and horses than they ever had before, and in return the animals got to meet the Press.

Next week, the computer spotlight again switches to North America, when only two months after the National Computing Convention, in Dallas, the IFIP congress opens in Toronto.

Having survived the New York blackout my US colleague Hersh ("Call me Texas") Wiener reflects on the kind of American showbiz razzamatazz that could meet the Toronto travellers...



Our US correspondent Taxes Wiener being taken for a ride.

THE ART OF LOVE...

Seen on the right studying a book on the art of love is cartoonist April Tatro, who drew attention to the flexibility of Powertec power supplies at the NCC in Dallas. She has been reportedly signed up for a new Laugh-In series.



LETTERS

Action areas for the proposed 'task force'

CONGRATULATIONS on your call for action, (CW, July 14). It is one of the most positive summaries of requirements for the computer industry that I have read for a long time. It is regrettable that such a call for action or indeed the action itself, has not come from one of the several official groups within the industry.

Most of what you say is right. However, don't get lost in the "Big Brother" syndrome.

Of course human freedom is important and that must be kept in mind at all times, but it is negative thinking at a time when we need all the positive action possible.

Let's face it, by 1990, the home/business computer linked into a national information grid will be fact, not fiction. When Graham Bell introduced the telephone in 1876, there were many public protests over its invasion of privacy.

I would add three further points to what I have read in Computer Weekly:

1. Industry, in general, does not have the necessary financial resources to invest in automation and allied technology up to the level you imply. It may want economies but how is it going to afford the front-end expenditure? Government grants or interest free loans? This is a question for our governmental policy makers.

2. Once set up, a call for action task force should also consider the export marketing aspects of the systems and hardware expertise built up by our own accelerated adoption of information technology.

3. The computer itself has been responsible for the human interface problem. Old batch processing systems generated the watertight department attitude — raw information went in and cooked information came out. As the outside employee or recipient

of "cooked" data did not know what went on inside the computer department, they naturally blamed the computer for all errors.

Batch processing is being replaced by distributed processing and applications oriented systems.

These will take away much of the DP manager's day-to-day responsibilities, placing them on the shoulders of the application user.

The warehouse manager will be responsible for his distribution system, the accountant for his number cruncher, and the factory manager for his production control system. The accounts clerks and progress chasers will become the computer operators.

In this way, information technology will be brought nearer to the user and hence the barrier between man and computer will gradually disappear.

A new breed of DPM will grow. Most medium-sized companies may not even have one. The DP manager's role will cease to exist at the small system end as hardware becomes more physically integrated into company offices and software becomes easier, only occasionally being visited by a service engineer. Its terminals will be used like telephones. As large companies today have their telecoms managers so will large companies have computer managers — people who know all about the application of information technology.

The telephone is a good analogy as it has caused a quiet revolution over the last 100 years in business and pleasure. We, however, cannot afford to wait for 100 years for the human interface to sort itself out and I therefore applaud your initiative.

TIM WICKS
Chairman

Interco Business Consultants Ltd, Kingston-upon-Thames, Surrey.

Biography

WE are undertaking a biography of the late Alan Turing, FRS, and would welcome information both professional and personal, which will if necessary be treated in confidence.

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OP SPOT

Comfortable rest rooms for operators, equipped with chairs, settees, television set, refrigerator, table, cooker, and sink — is this a dream or a reality...?

IN some installations, operators are provided with comfortable rest rooms and facilities. But surely these are in the minority. Most requests for facilities to be provided for operators are met with a refusal, usually on financial grounds.

Operators are quite justified in claiming well equipped rest rooms, even more so if they are working irregular hours. The cost of equipping a rest room is only a fraction of the annual DP budget, and will be more than recouped by improved staff loyalty and relations — and improved efficiency.

The benefits of installing comfortable rest and leisure areas are numerous. Engineers suddenly begin to use your site as a base when they are not on call-out, and in some cases the engineers are willing to provide an unofficial service outside normal contract hours.

In addition to benefiting from this improved engineering service, the facilities are available during normal working hours to be utilised by the entire DP staff, including the DPM.

Op Spot supports the opinion that adequate facilities should be provided for operators. DPMs, when refusing requests for these facilities, should consider the implications of their decision.

The improved efficiency that can result from the new facilities may well compensate for the cost of the exercise.

2960 for Hong Kong

FOLLOWING its order for a dual 2970, the Hong Kong government has, as expected, chosen a 2960 as an upgrade for the 1902A at the Treasury.

The new machine is to be a 2960, due for installation early next year. It will initially take on the workload of the 1902A under the 2960/DME operating system, which enables the programs to be run unchanged. However, during 1978, conversion to the large general-purpose VME/B operating system already being implemented on the government's dual 2970, will get under way.

Name change

A CHANGE of name has been announced for Harris-Intertype, the UK subsidiary of the Harris Corporation, which will shortly be known as Harris Systems Ltd.

Database service extended

THE transatlantic database service on offer to UK users wanting to access UK databases on the Tymnet network has now been extended to those accessible via the Telenet packet-switched network. Access is via the Post Office Data 200 service (CW, February 8).

There is also a new international data transmission service,

RAIR German subsidiary

THE London-based marketing firm Rair Terminals, has set up a wholly-owned subsidiary in Cologne to sell its range of terminal products all over Germany. These include the Digital Equipment DECwriter II and III

Rascal seeks loan powers for more takeovers

FOLLOWING the acquisitions of Milgo Corp of Florida and Hellermax Cassettes of Crawley, Sussex, Rascal Electronics is to seek shareholders' approval of an increase in the company's borrowing powers from the present £83,500,000 to £123,400,000, so as to be able to take advantage of any further acquisition opportunities as they arise.

Rascal chairman Ernest Harrison forecasts sales of £200 million in the year to March 31, 1978, compared with the £122 million recorded in the last financial year (CW, June 30).

The Milgo acquisition has resulted in a major change to the balance of Rascal's business, reducing the proportion accounted for by radio communications from 80% to about 65%.

The US company is to become Rascal-Milgo Inc shortly, and US reports suggest that Rascal is planning to hive-off the terminal division of Milgo into a separate company.

Rascal's magnetic media company Rascal-Zonal is broadening its product range with four new items for the mini, micro and

terminal markets. The four lines include a floppy disc with a special friction-reducing surface coating of oxide, a tape cassette conforming to ANSI, ECMA and ISO standards, a quarter inch tape cartridge and a magnetic card for word processors and office equipment.

A new appointment has also been announced. David Elsbury, managing director of Rascal-Tacticon, becomes a deputy managing director of Rascal Electronics, the parent company for the whole Rascal group.



Ernest Harrison... sales up from £122m to £200m forecast.

Comms show moves to Midlands

DESCRIBED by GEC chairman Lord Nelson as the Farnborough of the communications industry, the biennial Communications Show has outgrown its birthplace in Brighton and next year moves to the National Exhibition Centre in Birmingham.

The 1976 show boasted twice as many exhibitors as its predecessor in 1974, and next year will have three times the exhibition space of 1976. Yet only 20% of the stand space remains unbooked and the organisers expect to have a full house by the end of the year.

Another change is that the event is moving from June to April. It will open on Tuesday, April 4, and those interested in data communications should mark April 5, when the associated seminar will concentrate on PTT telecommunications. Themes for the other two days will be mobile radio communications on Thursday, April 6, and defence communications the final day, April 7.

In aid of disabled and blind computer staff

COMPUTER WEEKLY'S Annual Charity Ball

The industry's big night out

Computer Weekly is holding its second Charity Ball. Last year we celebrated our tenth anniversary, this year we are just celebrating. Come and join in the big night out for the computer industry and help us raise funds for the MATE project. Proceeds from the Ball are to be donated to the British Computer Society Specialist Group for the

Disabled to aid the development of MATE II, a memory-assisted keyboard terminal designed for use by disabled and blind people. The Ball is being held under the patronage of the BCS and we invite all our readers to support this very worthwhile cause and at the same time enjoy a pleasant evening with friends and colleagues.

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FILE DESIGN Part 6

By Owen Hanson

COMPUTER manufacturers provide well-supported software to aid the indexed sequential file designer. This is so convenient that the technique is often used when it is not appropriate, and the costs outweigh the benefits. The first question to ask is: should IS be used?

If an application requires only direct access, an IS file will always be at least 10% slower than a well-designed direct file, because a minimum of one head movement is necessary, in the required cylinder, followed by searches of the index and home tracks.

In the usual case, when the highest level index is not held in main storage, there will be two head movements and the time taken to locate a record may be up to twice that required by a direct file.

An individual enquiry will not be noticeably delayed, but the inquiry throughput will be limited. Thus, unless there is an additional need for sequential processing, or the inquiry volume is low, direct-only applications call for directly organised files.

Sequential applications are more complex. IS files allow both records (or blocks) and whole tracks to be skipped if they are not required. Some sequential files are so formatted that every record has to be read, whether it is to be processed or not. Others allow inactive records to be skipped; however, there is no way of skipping unwanted tracks or cylinders using a non-indexed file.

If the hit rate is high there is little opportunity to use skip-sequential processing, and a sequential file would be suitable.

Figure 1 shows the relationship between the number of records or blocks per track, the average hit rate per record (or per block), and the percentage of tracks that do not require updating.

The curves shown will apply for blocks; for individual records they hold for low hit rates, and when a hit rate of 70% means an average of one hit per record, ie some records may be hit more than once, rather than exactly one hit per record.

An IS file will save processing time, in comparison with a sequential file that can be

skip-processed, when more than about 35% of the tracks can be skipped. This is shown in figure 1. By reading the figure from the appropriate curve, the file designer can decide which technique to use.

If the sequential file cannot be skip-processed, an IS file will save time when an average of one or more records can be skipped from every pair of tracks. The precise figure is easily calculated in any given case, and the average break-even hit rate is fairly high. It is markedly lowered when processing is trivial or buffering very effective.

A genuinely mixed sequential/direct application will almost always require an IS file.

To optimise IS file design the following points should be considered:

1. Blocking factors. Larger blocks will mean a higher effective hit rate; the details were given in Part 2. If record hit rate is low, it is often worth exploiting this, rather than saving backing storage space by blocking.

2. Indices. Record keys should not be longer than necessary as this will increase the size of the indices. The highest level index should be held in main storage if possible; this will often be a better use of space than employing large data blocks. If the whole index is too large, IBM systems will hold part of the index in main storage, which still speeds up average reference time.

When the highest level index is too large for main storage, it should be held on the fastest direct-access device available, thus keeping the overall record seek time as low as possible.

3. Overflow area. When no additions are expected, the designer should ensure that overflow areas are not allocated.

In handling additions, the alternatives are: to leave space in each block or track; to leave one or two tracks per cylinder empty; to provide a separate area. The first causes a low data packing density, so the usual course is to choose a mixture of alternatives two and three.

If additions are even, eg one to every group of 10 records, only the second method is needed.

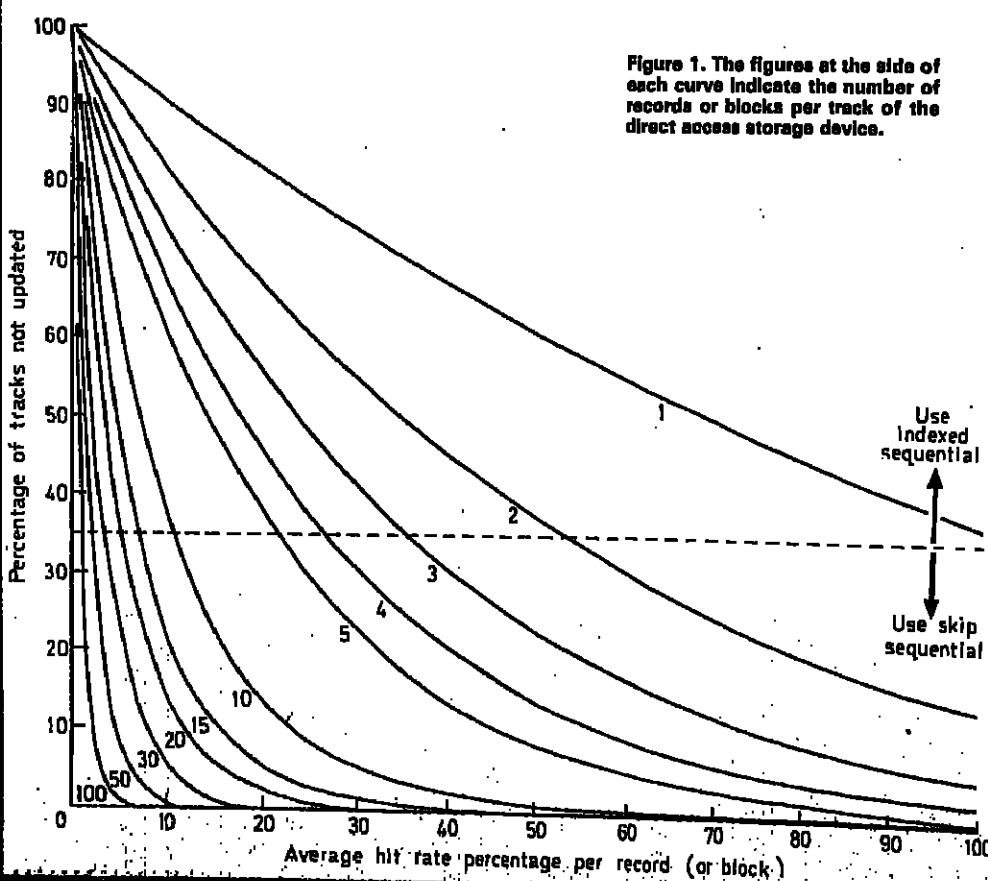


Figure 1. The figures at the side of each curve indicate the number of records or blocks per track of the direct access storage device.

SOFTWARE FILE

Atkins' success with CAD in small firm

AN example of the savings which computer-aided design can make in even a small company has been given by ISA Controls, of Shildon, County Durham, which claims to have made savings of

"hundreds of man-hours and thousands of pounds" with a design program developed for the firm by Atkins Computing Services and run on Atkins' Epsom, Surrey-based bureau.

Success for Pansophic with Easytrieve pack spin off

AN insight into the way that a software product can prove eminently applicable to an area for which it was not originally designed, is provided by Pansophic Systems' release of Easyaudit.

This is a trivially amended version of its Easytrieve information retrieval package, aimed at providing DP auditors with a tool to examine the data in an installation's computer files.

Easyaudit has had immediate success with an order from a major oil company, covering about 12 installations, in the US and a similar number in other countries. The order represents an income of about £250,000 (£144,500) to Pansophic.

The auditing area is particularly ripe for an approach from the software market, bearing as it does on the increasingly important question of computer-related crime, and its attendant topics of privacy and security.

The auditor is becoming an increasingly influential figure in US computer installations, and the UK is likely to follow suit, said Pansophic chairman Dean Mohlstrom.

Easyaudit is presented with detailed documentation describing the applicability of the data retrieval function to auditing of computer records. Fundamentally, however, the only addition to the Easytrieve software comes in the form of statistical sampling routines.

"Even these will not be specialised to Easyaudit", said Mohlstrom. "They will be made available, free of charge, to any Easytrieve user who wants them."

It is hardly an accident that computer auditing is one of the first areas to be singled out with a separately identifiable product. Security and privacy has long been a particular concern of Pansophic.

Pansophic has just come to the end of its eighth year of operation, with the announcement of a record £7.1m (£4.1m) turnover for the past year. This represents a 41% increase over the previous year's figures.

Further expansion is confidently expected, with a major new Pansophic product at the beginning of next year.

£1m target in sight

SYSTEMS house Applied Computing and Software, based in London, reports a turnover of £348,000 for the first six months of this year. This, says the company, represents considerable progress and leads it to believe that its target of £1m turnover for the whole year is attainable. Profits for the period are about £27,000.

Puzzler

TWO tramps, some distance apart, are walking towards each other at the side of a railway track. A train overtakes one of them, takes 20 seconds to pass him, and then meets the other 10 minutes later, passing him in 18 seconds. What time will now elapse, in seconds, before the two tramps meet?

Assume constant speeds throughout. See page 30 for solution.

PROGRAMMER NOTES

Why are testing aids so little used?

REPLIES to our comments on testing (CW, July 14) indicate that, as we suspected, software testing aids are not very widely used. Those installations which have used such aids, however, are unanimous on the large proportion of programming effort which is, or should be, devoted to testing, and the effectiveness of such aids in reducing this effort.

"Testing and debugging takes up 60% of programming time," says one correspondent. "If it does not, then, very often, it signifies that the important proving process has only been partially carried out. In this case, the results show up in the form of disasters during early, middle, or even late production running."

Although we have received fulsome praise of testing aids from their users, not one programmer has written to explain why he or she does not find testing aids effective.

Have we received a true indication of the usefulness of these aids, or are there still doubters among programmers? If not, why are the aids not more widely used?

Assessments of software tools for aiding other parts of the programming process were also requested, and this request too has provoked a good deal of response.

Particular success seems to be enjoyed by the users of preprocessors — software packages enabling programs to be written in a specially devised high-level language. The programs are converted by the package into statements in a conventional programming language.

N. R. Pickering, of Letchworth, Herts, uses such a preprocessor to generate all new Cobol programs at his installation.

This, he claims, "has reduced coding by around 70 per cent"; good news for the large number of programmers who regard coding as second only in boredom to the preparation

of test data. His calculation, he admits, was based on a character count. It is debatable whether this accurately reflects the amount of thought which went into the preprocessor programme as against a normal Cobol program. However, Pickering points out, reduced character count also means less likelihood of punching mistakes.

Machine-time overhead, he says, is minimal. "This depends on how many times the pre-compiler is used before the Cobol source is catalogued to the source statement library. It has proved to expand a Cobol program quicker than the corresponding 'compile'."

Perhaps it would be worth looking more deeply into such products. Can anyone offer more reliable statistics (eg program development times) indicating the saving in effort? Does the use of a more concise and more recently developed language lead to more structural programming, and is this reflected in the general code? Is it better to preserve preprocessor code or Cobol as the documentation and starting point for amendments?

Turning to a related topic, a phrase often heard in conjunction with structured programming is "the chief programmer team". The basic principle of working in small teams is widely viewed as effective, but is it as effective as it could be? Research in the UK claims to have uncovered a lack of "team management ability" among DP managers and chief programmers, which could be affecting productivity to a surprising degree.

Do UK programmers have any thoughts on this? There must be a good many programmers who have experience of being a member of a team. What are the techniques of organisation, or alternatively, what do you think your superior would be doing in this area?

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EDITED BY STEPHEN BELL

Why IBM gave its 'rivals' a briefing

THE amount of business which IBM owes to independent producers of software for its machines has at last been recognised by the company itself.

News is beginning to emerge of a technical briefing by IBM about six weeks ago at its offices in Poughkeepsie, New York, to which representatives of all its major software "rivals" were invited.

The meeting gave valuable indications of IBM's future plans in hardware and systems software. "They showed us everything," said one software man, "and we got straight answers to all our questions, with no evasion." He added that this represented a drastic change in IBM's previous relationship with the companies.

The products of many of the companies invited to the Poughkeepsie meeting have direct competitors among IBM's own software offerings.

IBM's software has, however,

long been regarded as inefficient. Some observers have said this is to be expected of a non-software specialist, but IBM has often been accused of deliberately producing resource-consuming software in order to sell more hardware.

With users becoming more critical of software performance, an increasing number of IBM sites are turning to independent software producers for systems software and utilities.

A report by US financial analyst Morgan Stanley last year maintained that, if it were not for the availability of independent software products, IBM's hardware sales would be seriously reduced (CW, August 5, 1976).

It now appears that IBM agrees with this assessment and recognises that it is in its own interest to keep its software "competitors" up to date on likely developments.

No comment could be obtained from IBM on the

reasons for the Poughkeepsie meeting, or on the prospect of a similar meeting in the UK for this country's software producers.

Other hardware manufacturers have been somewhat ahead of IBM in recognising the potential of independent software, and several have taken this to its logical conclusion by taking on and supporting the independent product as its own standard software.

Outstanding examples come from the world of databases, with ICL's adoption of Cullinane's IDMS as well as CDC and Honeywell's use of Cincom's Total.

It will be interesting to see whether IBM's new rapprochement with the independent software companies eventually leads it along the same path.

I.P. Sharp cuts telecomms costs with Mapl pack

TO improve service to multiple users at the same site using its APL time sharing bureau, I.P. Sharp Associates has gone into the minicomputer front-end business.

The company has developed terminal cluster control software for the Digital Equipment PDP-11, and will sell, rent or lease the whole software/hardware configuration, under the name Mapl.

Hitherto, users with multiple APL terminals at the same site had to use a separate line from each terminal into the local I. P. Sharp multiplexer. Mapl will allow up to 16 visual display or printer terminals to communicate along one line.

This will reduce the expense of communications while, at the same time, maintaining response times at a good level, Sharp claimed. Such low expenses will make time sharing much more feasible as an environment for running programs in production mode. Previously, many users hesitated to do this, reserving time sharing for program development.

The Phase 1 implementation

of Mapl is designed for relatively simple applications, with short phrases of input and output.

Phase 1 will also only support a group of users performing the same application and accessing the same "workspace" in the memory of the central IBM machine at the Sharp bureau.

Mapl Phase 2, scheduled for release in mid-October, will support more complex applications and allow more than one application to be performed concurrently through the same Mapl. Each concurrent application will, however, have to have a separate line to the mainframe.

A feature of the increased capability will be the availability of interactive interfaces to perform such tasks as input data validation and prompted input.

Future releases, said a spokesman, may allow non-APL applications to be performed within the mini concurrently with its Mapl function.

Mapl Phase 1 can be rented for \$1,000 per month, plus \$100 per month per terminal. Several of Sharp's UK users are already said to be interested.

CDI data dictionary seminar

A SEMINAR on a topic of expanding interest, data dictionaries, will be run by Control Data Institute in London, on August 16. The event aims to give DP management an appreciation of the value of a data dictionary in keeping track of its database or as conventional files.

The seminar will include discussion of the data dictionary

concept in general, examination of specific products and advice on implementation strategy. Speaker will be Bernard Plagman of DBD Systems Inc, a consultant specialising in database, data dictionaries and on-line systems development.

Venue for the seminar is the Gloucester Hotel, London, SW7. Cost will be £36 including lunch and literature.

Pafec suite enhanced

THE finite elements structural analysis suite, Pafec, as implemented by the Cybernet Time Sharing bureau, has been enhanced with the provision of several new shapes of elements, allowing closer approximation of the shape and properties of

complex structures. The Pafec suite was developed by a team at Nottingham University which, last year, formed itself into a company, Pafec Ltd. Cybernet is the only commercial bureau to offer the suite.

UK release for Dax

The console software developed for IBM DOS machines by BDI under the name Dax (CW, June 23) has been officially announced in the UK. Dax covers several functions — the printing of console messages relevant to a certain job on the end of that job's line printed listing; spooling of console output; and support of one or more IBM 3277 displays as consoles.

These functions have been taken on separately by most UK users; but at least two companies, unit trust manager Save and Prosper and motor dealers J. W. Hanley, are considering use of the complete package.

Initially, the Chiswick offices will house 30 staff. The existing offices in nearby Brentford, will continue as the head office and

Chiswick gets a window into KPG

COINCIDING with its announcement of a new software/hardware product, systems house KPG has extended its premises to two separate sites. The new office, Chiswick, West London — will house its programming staff, and will include, for the first time, a computer room visible from the street, exhibiting a variety of equipment.

Initially, the Chiswick offices will house 30 staff. The existing offices in nearby Brentford, will continue as the head office and

sales base. The move is planned as an initial step in a long-term expansion program.

One of the systems on show in Chiswick will be the new product, Solitaire. It is claimed to be the first single user accounting and business management system to be based on a microprocessor.

The basic set of Solitaire software covers purchase, sales and nominal ledgers, cash-flow analysis, invoice production, payroll, order processing and stock control.

Software for other functions including solicitors' time recording and incomplete record management for accountants, is also available.

The Solitaire hardware includes an unnamed make of processor, visual display terminal, printer and floppy discs. The configuration is priced at under £10,000, including one suite of software. Extra software is chargeable.

Facilities management pact

A "SOFTWARE" "facilities management" agreement has been concluded between Safe Computing and the Birmid Quicfast foundry. The Safe consultancy will handle all future software development and maintenance for Birmid, and has taken on seven of the company's software staff.

This novel type of arrangement could become increasingly adopted, the companies predict. It offers the customer a team with wide-ranging software experience, gives the staff greater job satisfaction and could provide an outlet for any generally applicable software developed, they contended.

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PEOPLE

UK vice-president for Calcomp

FIRST Calcomp vice-president to be appointed outside the US is Brian Higgins, who becomes vice-president for European operations. As in his previous job as European regional manager, he is responsible for an area stretching from Scandinavia to North Africa and which includes subsidiaries in the UK, Holland, Germany, France and Italy. Higgins joined Calcomp from De La Rue Ball - GE in 1987 to set up Calcomp Ltd. He became European regional manager in 1973, and at the same time was appointed chairman of the UK company.

At Calcomp's Anaheim, California HQ Paul Steinkendorf, previously vice-president, corporate planning, has been named corporate vice-president, international division.

Mervyn Farrant and Jeremy Roberson are the joint managing directors of K3 Software Services, Kalamazoo's newly-formed subsidiary. Besides software services, K3 will offer a consultancy service to potential buyers in the mini and small computer field. Farrant was previously Midlands branch manager with Burroughs, and Roberson was Burroughs' Midlands regional systems manager.

John Heey has become managing director of Memory Business Machines, a company within the Memory Ireland group. His previous positions include that of general manager of Robert Wilson (Ireland), director of the Aer Lingus catering subsidiary, and NCO and adviser to Nigerian Airlines and Guinness Peat Aviation.

Soccer

ONLY three matches have been played in the Summer Computer League this week, and the most significant result was in division three, where Altopro beat the leader, 3M, and went top. The game ended 3M's chances of winning the division, as the team has now played all its matches, but the situation at the top is very tight. Control Data, in fourth place, still has to play ICL, which is third.

Latest results:
Division 1
Southwest 6, Computing 0
Division 2
Computer Weekly 5, Extel 0
Division 3
Altopro 4, 3M 1

Top of division three:
Altopro 6 4 2 0 34 11 10
IM 8 4 1 3 27 17 9
CL 5 4 0 1 18 7 8
Control 5 3 1 1 22 13 7

Would teams please note that any Birmingham telephone number has changed to 01-240 223.

TUC Youth Award goes to Apex man

AN outstanding young trade unionist, Roy Leeming, of Apex, the Association of Professional, Executive, Clerical and Computer Staffs, has been chosen to receive this year's TUC Youth Award.

Leeming works in administration with the British Aircraft Corp in Preston, Lancs. Besides being an active member of the local Labour party, he is branch delegate to the North-West area council of his union and delegate to the North-West Area Engineering Advisory Council, the Preston and District Trades Council and the Preston and District Confederation of Shipbuilding and Engineering Unions.

Ron Elsenhauer, until recently UK sales manager with Digital Equipment, has returned to America. He is replaced at Digital by David Buckingham, whose job as Central and South-West UK district manager is taken by Bill Passmore.

The chain of promotions is completed by Terry Forde, who becomes North European regional manager for the laboratory and education markets in place of Passmore. Forde was formerly Reading branch manager.

Charles Arkebuher has been appointed general manager of European operations with National Semiconductor. He replaces Jack Jordan, who takes on the new post of group director of international marketing at the company's Californian HQ. Arkebuher was formerly general manager of National Semiconductor, Japan.

Brian Betts becomes marketing executive with Kins Applied Technology, which is a member of the W. S. Atkins group. Formerly he was marketing manager of Digitronics.



Royall

Palmer

Frank Fish, until recently European vice-president of Mathematica Products Group, the New Jersey-based consultancy, is transferring to the Princeton, New Jersey HQ to become vice-president of international operations. Tony Royall has been promoted from area manager to manager of UK operations.

Graham Palmer has been appointed an associate director of CMG Computer Management Group UK. He has been an associate director of several CMG subsidiaries in succession, most recently with CMG City of London.

Karl Brdlik, vice-president of Comtech Life, Montreal is moving to Toronto to become vice-president and general manager of Comtech's small business systems division.

Comtech Ireland has a new managing director, Ron Zamboni, and the following managers have been appointed: Robert Kiley, technical programming manager, and William Luttrell, systems project manager, both from Cara Data Processing, and Peter Hession, systems project manager, previously with UCC Datacom.

Brendan McElhill, hitherto European marketing executive with Computer Automation's Naked Mini Division, has been promoted to European marketing manager.

Ken Woods, general manager of Pary Computer Services, has been made a director of the company.

DIARY

AUGUST 8-12
IFIP Congress 77/Exhibition 77/Media 77, International Federation for Information Processing, Toronto, Canada.

AUGUST 16-18
Operational data security workshop, University of Kentucky, The City University, London EC1.

AUGUST 21-26
Law of the world conference, World Peace through Law Centre, Manila, Philippines.

SEPTEMBER 8-9
Compton 77 - micros, minis and mainframes, IEEE (USA), Washington, DC.

SEPTEMBER 14-15
Digital processing of signals in communications - conference, IEEE, Loughborough.

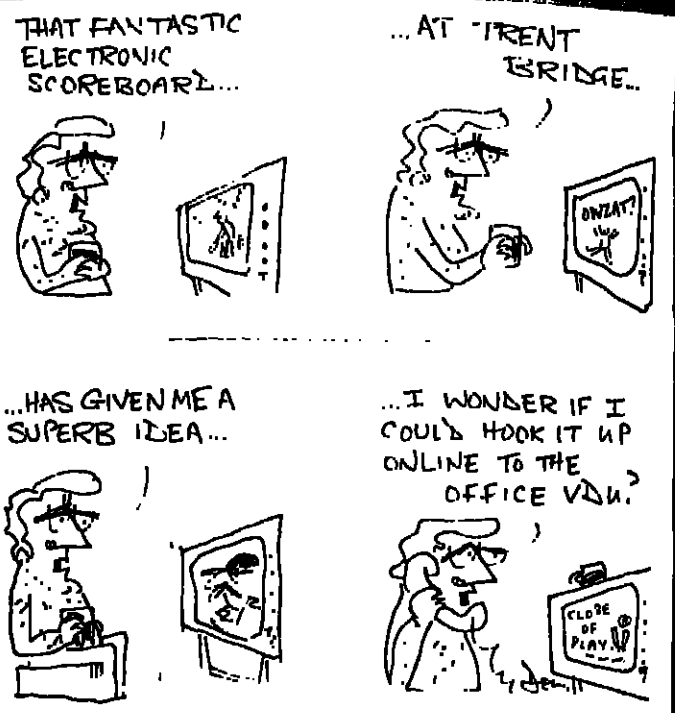
SEPTEMBER 18-19
Symposium on data analysis and informatics, Institut de Recherche d'Informatique et d'Automatique, Ruequers, France.

SEPTEMBER 14-15
Society for Management Information Systems, annual conference, Dallas, USA.

Details: SMIS, Suite 202, 221 North LaSalle Street, Chicago, Ill 60601, USA.

SEPTEMBER 18-23
Applications of numerical software conference, Institute of Mathematics and its Applications, Southend, University of Essex, Brighton.

Liveware File by Don



COMPUTER WEEKLY

The following special supplements are due to be published during
AUGUST/SEPTEMBER

DISTRIBUTED
COMPUTING FEATURE
August 11th

Distributed computing - what does it mean? This computer feature is a study of the distributed computing environment. It is a study of the distributed computing environment. It is a study of the distributed computing environment.

COMPUTING AND THE
ACCOUNTANT
August 18th

In most companies the accounts department has been one of the least likely to use computer technology. But now it is not only the accounts department but also the accounts department that is using computer technology.

INTERNATIONAL EDITION +
BONUS CIRCULATION
SICOB PREVIEW
September 8th

In September, Pary Computer Services has a special offer for its International Edition. It is a special offer for its International Edition. It is a special offer for its International Edition.

Computer Weekly of course has a special offer for its International Edition. It is a special offer for its International Edition. It is a special offer for its International Edition.

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MICROPROCESSORS

Gene Amdahl, father of the 360 mainframe and big machine challenger to IBM, recently said, "Microprocessors are the most revolutionary development in the computer field in my lifetime." That summarised the feeling of most commentators on the computer/information technology scene.

The ultimate impact of that revolution, however, is still little more than intelligent guesswork, for as Computer Weekly's new microprocessor correspondent Martin Banks says in the first article to this microprocessor supplement, micros will take DP into areas where existing systems cannot venture.

Banks looks at some of the ways in which micros could break new ground. On pages 12 and 13 Martin Healey and Alex d'Agapeyeff relate micro developments to small business systems and commercial DP departments, and on page 14 freelance journalist and DIY computer enthusiast Quentin Scott

looks at the joys and tribulations of home-brew computing. Alex d'Agapeyeff will chair a conference organised by Online on the microprocessor in data processing, to be held in London on October 20 and 21. Martin Healey will be one of the speakers at the conference.

Going where no computer has been before...

By Martin Banks

NOBODY can deny that the microprocessor is one of the most significant semiconductor developments in recent years.

The way in which the micro will be used, however, is still not clear, primarily because the development has two distinct aspects.

Firstly, when the microprocessor is enhanced to a full microcomputer, its main uses will be as a more powerful and cost effective element in traditional DP applications.

But, in its simplest form, microprocessor units (MPUs) will find their way into a wide variety of applications, such as washing machines and motor cars, going where no computer has been before.

To determine where these areas will be, we must first examine the main types of application to which the microprocessor has already been put.

The majority of live systems based on MPUs can be categorised in two major groups: computer-based and electronic-based.

In the former grouping the devices have been used either in a typical computer configuration, such as a minicomputer, in order to extend one or more parameters of its performance, cost and/or specification, or it has been employed in smaller scale versions of systems that are currently based on available computer hardware, such as a communications controller.

In the second group, the use of micros has generally been confined to the area of electronic instrumentation, where they have been drafted in to enhance measurement capabilities beyond those economically feasible with standard random logic hardware.

These two user groups have one thing in common: experience and expertise in one of the two main technical disciplines involved in applying the MPU.

The computer-based applications have, by definition, been developed by people skilled in software and systems management. The electronics applications have likewise been created by people knowledgeable in the ways of the microvolt.

Yet these two areas miss a significant section of the total.

In many ways, the problem of communication is the largest single hindrance to the future applications development of the MPU. The device manufacturers and suppliers, well schooled in the ways of the electronics industry in general, now find that they are not preaching to the converted, and as a consequence, they often lack the right evangelist touch.

applications available: the enormous number of uses to which the device can be put in industries where electronics and computers are still considered as a "black art", and where mechanical and electro-mechanical systems rule the day.

That the scope for applying the MPU exists in these industries, nobody will deny. The devices are the key to systems that would be economically or technically impossible by any other approach.

In many cases the purchase of a complete minicomputer or the development of a custom-designed electronic control system would be an economic sled-

ge-hammer for many industrial units. With the MPU, costs per control function have suddenly tumbled to realistic figures and equally suddenly, left the industry with the task of communicating this message to a largely uneducated audience.

In many ways, this problem of communication is the largest single hindrance to the future applications development of the MPU. The device manufacturers and suppliers, well schooled in the ways of the electronics industry in general, now find that they are not preaching to the converted, and as a consequence, they often lack the right evangelist touch.

It is therefore possible to predict the need for, and rapid rise to power of, a new breed of consultants. Their role will be primarily to act as the interface between the hardware (and even software) supplier and a single or related range of industries.

In many industries, manufacturers are beginning to realise that just one device type can, if they themselves have the time, money, expertise and knowledge of a multitude of individual requirements, be designed to meet an almost infinite number of applications.

The growth of such consultancies would shift from the manufacturers much of the responsibility for applications development, and release them for the work of device development. It is an area of their work that many would be happy to be rid of, for the nature of their products, and the processes employed in their manufacture place them squarely in the low cost/high volume "ballpark".

With the MPU, the volume is not yet high, while unit cost is obliged to remain competitive, and rumblings are beginning to

be heard that the extra costs incurred by the manufacturers for software and systems staff is, at the least, questionable. Additionally, what is true for that other traditional source of electronic devices, the component distributor.

This is not to say that the manufacturers would like to shed all their software staff overnight, for the discipline will certainly be instrumental in many of the technical developments made in microprocessors. Although there will certainly be some development of new software packages to meet the requirements of the MPU, the most important ones will come in moulding the functions and architecture of the MPU to meet the requirements of the many packages already available.

The refinement of production processes will inevitably lead to marked improvements in the functional density and operational capabilities of the devices. Major manufacturers are already

cause of the improved functional density. The normal result, however, has nearly always been the reverse, an increase in the functional capability of the equipment for the same size.

Memory and interfacing components are the two most obvious areas that directly affect the system designer and user. Memories for the MPU market, rather than for mass memory usage, are an important development area, especially in the field of erasable PROMs.

As the applications of MPU based systems expand, so will the demands put upon them in both process refinement and pricing. It is possible to foresee improvements in their capacity, and substantial price reductions, as their market expands.

There should also be some improvements in methods of dedicating these devices. In terms of brute semiconductor memory capacity, a considerable increase can also be predicted.

In the interface market, there are probably nearly as many "new" devices as there are applications to use them.

Each change has produced the possibility for considerable size reduction in end equipment, if desired, because of improved functional density. The normal result, however, has nearly always been the reverse, an increase in the functional capability of the equipment for the same size.

outlining the trends they foresee, and the early 1980s should see devices of 32-bit capability, with perhaps 8K bits of ROM, in a single package, on a single chip.

Wherever they come from, it will be these devices that will be truly worthy of the name microcomputer, for they will have an equivalent processing power to a basic minicomputer, while if configured into a distributed processing system, they will far exceed any cost/function performance/available in current approaches.

Where the MPU is to be applied to direct computing and data-processing business, it will be in the distributed approach that it will find most use.

In this respect it is interesting to note that the MPU appears to be following the traditional path of development in semiconductor technology. Each change has produced the possibility for considerable size reduction in end equipment, if desired, because of improved functional density. The normal result, however, has nearly always been the reverse, an increase in the functional capability of the equipment for the same size.



This week the author of this article, Martin Banks, joins Computer Weekly to report on the way microprocessors are affecting the computer business.

Banks has been in technical journalism for about 10 years. He was news editor of Design Electronics in the early 70s and subsequently worked on Electronics Weekly.

Prior to joining Computer Weekly, Banks was deputy editor of Electronic Equipment News.

Early improvements in this situation can be expected in the form of moves towards standardisation by the manufacturers, although two other solutions are possible in the longer term.

The first could well be based on uncommitted circuit approach, where a standardised circuit configuration is produced in volume. To meet a particular interface requirement, a circuit is then taken for one final process step - the deposition of an interconnection pattern to commit the device.

The other possibility is the development of a "universal" interface, perhaps itself based on a simple MPU.

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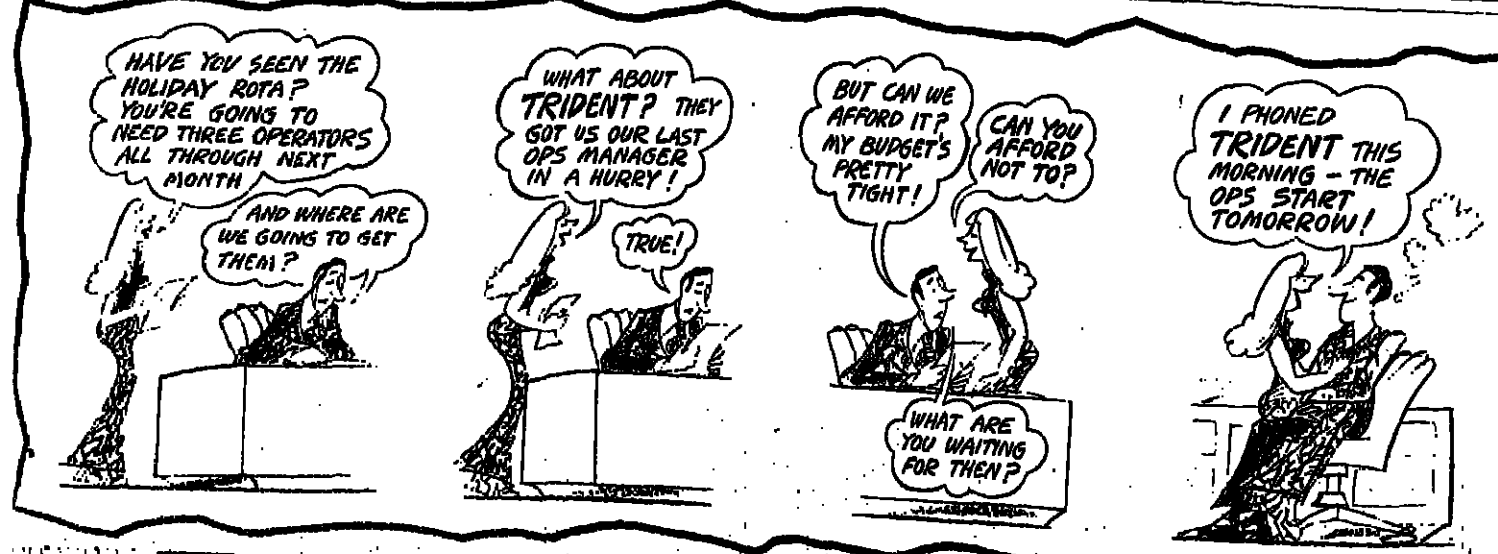
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An example of a successful micro-based business system is this installation at Farnham Housing, of Farnham, Surrey. Supplied by Compelec Electronics, the £8,000 system uses an Altair 8800b, based on an Intel 8080, and includes a Soroc IQ 120 VDU for input and file updating, and a Centronics 700 printer for output. Applications include invoicing, sales ledger and stock control. Customer files and other data are stored on floppy discs with a total capacity at present of 600K.

Scene is set for 'cowboys' to move in

By Martin Healey

THE data processing industry needs little in-depth knowledge of microprocessors. The main impact of advances in LSI technology will materialise in cheaper, more flexible and generally better variants of the traditional tools.

The microprocessor is simply an electronic component. New minicomputers are already constructed around the more sophisticated bit-slice microprocessors, while most feature microprocessors in interface and

controllers.

Multiple-processor systems, either clustered or distributed, will replace bigger computers, as the microprocessor materialises as a new form of computer. The major impact for the DP industry will be the changes in management techniques and the increased range of work that can be done.

Software for microprocessors is, after a slow start, also improving, with extensive use of cross-software products, and a number of stand-alone systems have been developed, complete with peripherals, which support operating systems, compilers and other utilities.

This development of micro-based systems has been one of the driving forces behind the growth of the small business systems market.

Possibly the Digital Equipment 310, based on a PDP 8, not a microprocessor, showed the way with a reasonable disc OS and an excellent new language, Dibol, with resident compiler. This line continues with the LSI-11 microprocessor-based PDP 11/03.

Other systems, designed as intelligent online terminals, have all the requirements of small business systems, eg. Datapoint 2200 and Jacquard J100. Both are based on microprocessors, the former a special version of the 8080, more like the Z80, and the latter on a 16-bit National Semiconductor multi-chip microprocessor.

All these configurations feature operating systems which, for small processors, are remarkably advanced. All use high level languages and even offer multi-programming. Equally important, they are upgraded to multi-terminal hard-disk based systems.

Probably the most important development to date, however, is the advent in the US of the do-it-yourself computer, led by the MITS Altair 8080 system.

This is a remarkably well engineered computer which supports a disc-based Basic system. Indeed the 8080-based system marketed by Extel is said to use similar software.

With a printer, VDU, twin floppies and 32K byte memory, a DEC Dibol system costs about £15,000, while an Altair costs about £8,800.

What then is the catch? There is not one really, but there is a lot of room for manoeuvre in which many innocent end users are going to get hurt.

There are two problems to using the DIY systems, maintenance and applications programs. The former is not a serious worry because cards are cheap enough to make plug-in maintenance practical and it is certain that the independent maintenance companies will be looking to these machines as a good source of business.

The situation with applications is rather worrying. With hardware prices down to VRC levels, the unsuspecting end user is expecting the £500 touch from software as with the VRC. However, the disc system having provided enhanced capabilities, also requires more complex programs to use them.

The increased versatility



Martin Healey, who is senior lecturer in the Electrical and Electronic Engineering Department at University College, Cardiff, says that it is to be hoped DP professionals will quickly gain a working knowledge of microprocessors so that they can realise the potential and the pitfalls — and concentrate on the real business of processing data.

means that A doesn't really want what B wants, which is the inherent weakness of all packaged solutions. Somebody supplying the computer must spend time specifying the user's requirements, which costs money.

The real facts are that the applications software for a £8,000 floppy disc system is almost as expensive as for a £25,000 mini-based system.

Indeed it may be worse, since a turnkey system supplier is looking to an OEM discount to contribute to his income. From a DIY system this income would be much lower.

Thus the scene is set for the industry "cowboys" to move in. Since a machine like the Altair uses Basic, accounting packages are available. These will be sold cheaply to a gullible user who will then find that after-sales support is non-existent.

Further software development will then have to be contracted to a software house which will prove expensive since there is no OEM hardware income and it is most unlikely that the "package" will include any documentation.

One final point to make here is that the DIY machine is suitable for programming the enthusiast, so that many executives of small companies are doing it themselves.

Remember, however, that applications programming is more about system analysis and design, file structures, coding procedures, etc, than coding.

It is to be hoped that DP professionals will quickly gain a working knowledge of microprocessors so that they can realise the potential and the pitfalls and concentrate on the real business of processing data.

Impact of micros on DP department

By Alex d'Agapeyeff

GROSCH'S LAW, as everyone knows, stated that the power of a computer was proportional to the square of its cost. It was this law which provided the intellectual justification for the big machines widely employed in data processing. The corollary was the centralisation of processing, the dominant position of the DP department and one snag that is not too widely discussed: central processing encourages very large programs in which most of the coding is only there because the programs are so large.

Large, central processes must be kept running continuously, must embrace an enormous number of exceptional cases and must utilise the configuration with tolerable efficiency. The doing of all these things requires yet more code in the systems software as well as the application programs. One might postulate that there is another and more important law to the effect that the complexity of a program is proportional to the cube of its length, due to the inter-relationships arising from the code. It would seem that the excessive number of programmers constantly assigned to the care and maintenance of existing programs is evidence of this law.

The remarkable achievement of micros is that they have not only negated Grosch's Law but actually reversed it for certain purposes. It is possible to assemble a microcomputer from the latest, large scale integrated circuits to carry out simple arithmetic far more cheaply than on an IBM 380/16K. DP is more difficult because of the problem of handling bulk data. Existing, single processor microcomputers with floppy discs can be classified as sub-minis but they are often half the cost of a traditional, small, minicomputer. However, machines made up from multiple processing elements can be made very powerful and yet be of comparatively low cost.

The IBM Series 1 may well prove to be the forerunner of a quite different kind of machine. It has a powerful instruction set that is an improvement on some mainframes. Its central processor is based on fast microcircuits. It can be readily coupled to a variety of peripherals through I/O interfaces which are themselves processor boards. Although it is not sold as such it could be regarded as a rather attractive alternative to conventional, mainframe computers.

The future role of micros is, nevertheless, entirely independent of the potential replacement of conventional computers. This point is of obvious concern to DP departments but the outcome is inevitable; only the timing is uncertain.

The real importance of micros rests upon the fact that, both processor and memory circuits have become units of mass production. Some peripherals are also moving in the same direction. The effect is that the cost of these devices is more related to the volume of production than to their content. Thus a processor circuit can be bought for less than \$10 and Shugart have a multiple, if small, disc system for less than

\$800. At the same time the content of these circuits, that is their level of integration, is increasing at a furious pace. For example, Texas Instruments have a circuit of roughly 100,000 bits enabling them to offer a terminal with up to 80,000 bytes of storage.

CAP MicroSoft has estimated that by the end of 1980 there should be over a million reprogrammable processors in Western Europe. The big areas of usage will include small business machines, text processing, telecommunications, machine tools and home TV units linked to both Teletext and Viewdata but with a general purpose computing capability.

By 1980, therefore, most clerical offices, however small, will have some kind of processor based equipment. The same applies to each section of most factories. Who is going to plan, organise and buy these processors? Who is going to program them? Indeed, how are they to be programmed when the population of reprogrammable processors is more than five times the number of professional programmers?

Monopolies tend to die hard. Some DP managers refuse to believe that other departments may go ahead and buy their own computers. "It would lead to chaos," they often say, perhaps with justification, but in my experience few DP departments actually know how many processors are already installed in their organisation. Once a group of, say, engineers get into the habit of ordering and programming their own computers they seldom see any point in going to the DP department for help.

Nonetheless, the opportunity for DP remains. The proliferation of micros should lead to a corporate responsibility, by someone, for guiding their exploitation. There are also good grounds for contriving the training and even the conduct of kernel programming regardless of the area of application.

If the opportunity is to be grasped it must centre on the quality of the service provided. This may involve less emphasis on processing but more on programming. These programs must be shorter, simpler and cheaper. Fortunately, this is more practicable now that processing efficiency is less vital with low cost machines.

The first thing to be acknowledged is that, given a free choice, users would rather write their own programs without analysts and programmers as intermediaries. Fortunately, for those of us in the business their choice is not free. Without training the amateur programmer cannot write serious programs. However, he or she can use command languages, declarations and so forth to provide local variations on top of a suitable kernel produced by the professionals. This is done quite widely with Mark IV and is the only apparent path which could keep program maintenance within reasonable bounds.

The question is how can these kernel systems be written for the vast range of small, processor configurations that will be acquired. For example, CAP has 18 computers installed on its

premises or due for early delivery of which 12 have their own distinct instruction sets. Within two years these figures could double. Clearly it is not practicable to re-write common applications for each instruction set in use. Moreover, many of the smaller configurations, such as a microcomputer board connected to a floppy disc and VDU, are not themselves suitable for program development.

The solution lies with what are called host development systems that are equipped with genuinely portable programming languages. For instance, a

number of companies will be buying, presumably, lots of Series 1 which will include very small configurations for, say, controlling air-conditioning, security surveillance and for local ledger work. In such a company a wise DP department will obtain a large model Series 1 for developing, at least, the kernel programs on all the others.

The same DP department may then find it would be helpful if that host system could also be used for developing programs for non-IBM processors. This has not yet been done for the

Series 1 but that is only a matter of time. Tektronix have a universal host system based on the Millennium computer which is aimed at engineering applications and CAP has done the same on the PDP-11 for DP applications. Any host can be equipped with a language that is interpreted on the target systems in a way that will ensure portability. Several universities have done this with the language BCPL and now CAP has done the same with MicroCobol.

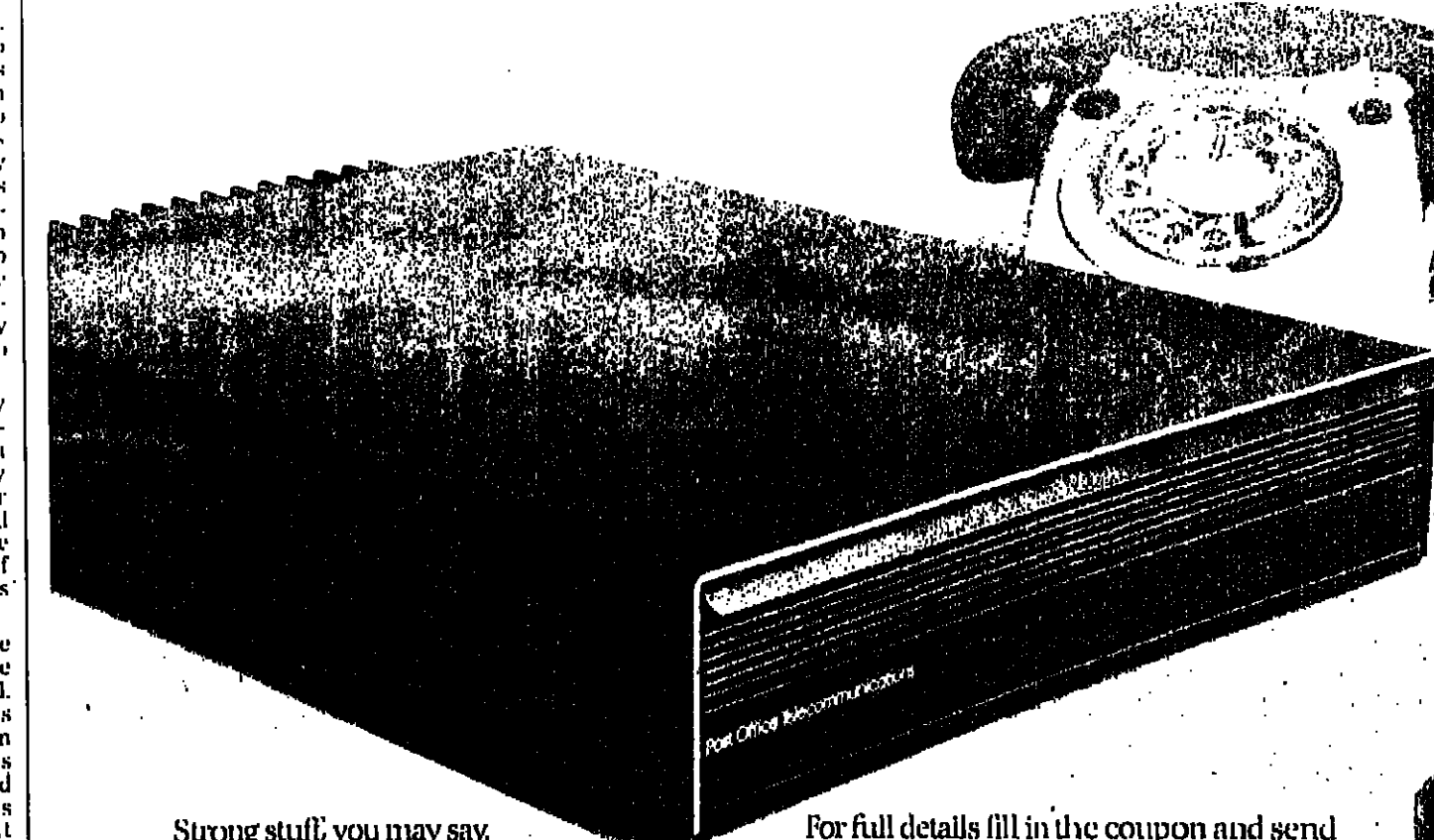
Programming then can be the key to the future opportunities for DP departments.



Alex d'Agapeyeff is chairman and managing director of the CAP-CPP Group, which was founded in 1962 and now retains over 600 professional staff throughout Western Europe and the Middle East. Former president of the British Computer Society and member of SRC's Computing Science Committee and the Computing Systems and Electronics Requirements Board, d'Agapeyeff is chairman of CAP MicroSoft, the group's new subsidiary, developing software tools and products for microcomputers in addition to a general service for users of these devices.

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Your experience is required now. A very large number of vacancies are registered where a knowledge of Assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Herts. and Manchester on this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers CW 31/6 Michael

Time Sharing Programmers to £6,000

C LONDON

If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre- or post-sales support. Some offer generous bonus schemes. CW 31/7 Michael

MIDLAND OPPORTUNITIES

Analyst/Programmer - Birmingham £3K-£6K
A major manufacturing firm requires Analysts and Programmers with experience on IBM mainframes plus at least 18 months experience in PL/I or Assembler.

Analyst/Programmer - Coventry £3K-£6K
A software house requires Analysts and Programmers with experience on IBM ICL Burroughs or ICL mainframes using Fortran, Basic, Plan or PL/I.

Programmer - North Birmingham £4K
A subsidiary of a major brewery requires Programmers with at least 18 months experience using Fortran and Fortran II on mainframes or experience would be an advantage.

for details telephone
Keith Hush 01-439 6299

ATA Selection & Management Services
202 New Street
Birmingham
B2 4JH

SHIFT LEADER

(Ref. M85)
Salary Range: £3,780-£4,035 p.a.
Inclusive plus 14% shift allowance
(Communications Manager, data-view, main-mop)

Lambeth Computer Centre have a highly successful computer installation which currently operates on ICL 1903T and 1902A computers and includes a 32K 7803 front end processor. The computers are operated under GIL.

In addition to its manual batch processing which covers two shifts, the installation supports an extensive communications system utilising ICL 7181, 7802 and 8700 terminals.

We are looking for a mature person to lead a small team of operators. Ability to motivate and experience in engineering staff and scheduling work is of prime importance. He/she should have experience of the ICL 1900 Series Computer and a knowledge of GIL and communications. A minimum qualification of 6-8 years is essential.

The two shifts operated are from 8.00 a.m. to 3.30 p.m. and 10.30 p.m. to 7.00 a.m., for which a allowance of 14% is payable.
The computer is housed in a pleasant, modern unit Centre within easy reach of railway stations, buses and shops. Canteen facilities available. Help may be given in agreed cases with removal costs. Season ticket loan scheme in operation.

Application forms are obtainable from the Personnel & Recruitment Office, Directorate of Management Services, London Borough of Lambeth, 12 Porden Road, Brixton Hill, London SW2 6SE. Tel: 01-274 7722, Ext. 146. Closing date: 18th August 1977.

LAMBETH

OPPORTUNITIES IN R.P.G. II WATFORD, HERTS PROGRAMMER & ANALYST PROGRAMMER C £6,000

Our client is a major international manufacturer of customised industrial components, with offices in the U.S.A., Europe and Great Britain.

Prior to installing a new 64K I.B.M. System 3, Model 12, they are currently seeking to recruit a Programmer and an Analyst-Programmer to assist with the implementation of the new machine, due for delivery at the beginning of next year.

ANALYST-PROGRAMMER will report directly to the Data Processing Manager, and will be responsible for implementing an order-entry system, production control systems and various financial systems, all running under R.P.G. II.

PROGRAMMER with at least one year's meaningful experience of R.P.G. II, the successful applicant will assume a large degree of responsibility for the programming work and can expect to work closely with the Analyst on the new systems being implemented.

As these are new appointments, in a new department, the prospects within the company are limitless. Foreign travel is also envisaged at a later date.

INTERESTED? THEN RING DEREK WREAY ON 01-439 6299 TO DISCUSS THE POSITIONS FURTHER.

THE IDEAL MARRIAGE !! COBOL PROGRAMMING & COMMUNICATIONS LONDON W.1 SAL. C £4,500

Our client, one of the world's largest British owned Engineering and contracting organisations, serving oil petro-chemical process and metal industries throughout the world, currently seeks to recruit a small specialist programming team.

The successful applicants will initially play a major role in the redevelopment of an American accountancy system based on a remote site UNIVAC 1100/21 using an On-line VDU cluster for programme development.

DON'T DELAY!

Ring Colin Hush on 01-439 6299 (reverse charges) for further details

OPERATORS IBM 370/158 M.P. LONDON/WEST OF LONDON £3,700-£4,200

A leading Bureau is in the process of setting up a new Data Centre in the West of London to complement their established Central London Data Centre.

Their requirement is for experienced operational staff.

The successful applicants will have at least one year's operating experience on large IBM equipment supported by OS or VS operating systems. A knowledge of teleprocessing and JCL/utilities would be an advantage.

If you are interested then contact William Glasswell on 01-439 6299, quoting Ref. No. W.G. 736.

EXCEPTIONAL PROGRAMMERS GREATER LONDON £5,500 + Travel

Do you think that you are ready for a move into the lucrative and demanding consultancy field?

Our clients are a leading and expansion-orientated software house, looking for programmers with the flair and ability to fulfil their client's insatiable needs for consultants, with the experience and know-how to help them solve their day-to-day problems.

If you have a thorough understanding of large mainframe machines, plus a good working knowledge of any one of the following, Cobol, Assembler or PLI, then we have just the position for you.

The total remuneration package carries a top-level salary, profit-sharing and generous travelling expenses.

If you are a professional, then this is the job for you.

Ring Derek Wreay on 01-439 6299 for an informal discussion.

FREELANCE 5-MONTH (MIN.) CONTRACT Commercial Software Programming in R.P.G. II Wembley; start S.A.P. to £165 p.w. Telephone: Colin J. Hush 439-6299

Computer Appointments Register

Regent House, 54-62 Regent Street, London W1A 4YJ. Tel: 01 439 6299 a member of The Federation of Personnel Services

SYSTEMS PROGRAMMERS IBM 370/158 M.P. CENTRAL LONDON/WEST OF LONDON TO £6,000

Our client, one of Europe's leading Computer Services Centres, is setting up a new installation in the West of London. They have a requirement for Systems Programmers with a strong system bias, to be based either at their office in Central London or at the new site. Applicants should have a minimum of 3 years' experience with a wide IP experience (software and hardware) and will be involved in problem solving, enhancements and future planning including SNA/VTAM/NCLP. Currently we utilise the following software: ICAM/BIAM/RTAM and 3705 EP.

A Systems Programmer is also required to develop and update operational procedures, and provide a link between systems programming and operations. The successful applicant will currently be a Systems Programmer or a Systems Operator with technical offline responsibilities.

If you are interested then contact William Glasswell on 01-439 6299 quoting Ref. No. W.G. 785.

MOVE ON TO THE 2900 RANGE LONDON SYSTEMS/ANALYST C £5,000

Our client is one of Europe's leading retailers of quality footwear. They have a requirement for a systems/analyst to work on their present machine, a Burroughs B735, and subsequently to assist in the transference to an ICL 2900. Applicants in their mid-20's should have spent at least 2 years in a commercial environment engaged in programming and systems work. The successful applicant will be involved in major conversion projects, and the design and implementation of new systems.

Situated in an exclusive part of London, the company offers an attractive salary, plus benefits. If you are interested in this exciting opportunity, then contact William Glasswell on 01-439 6299, quoting Ref. No. WG 733.

A UNIQUE OPPORTUNITY TO GO ON-LINE PLAN OR ASSEMBLY LEVEL C £5,000

HERTS
The information services division of a leading organisation urgently seeks to recruit an experienced Analyst/Programmer who will play an important role in the development of on-line systems, one of which is for the international exchange of Data.

This is an excellent opportunity for someone with approximately 2 years' plus experience in Data Processing. Preferably using PLAN to move into an environment which is geared towards operating at the forefront of Systems Technology within its field.

The successful applicant will receive an attractive salary and generous fringe benefits which include flextime working and the possibility of first-class accommodation locally. If you are interested in progressing in this exciting field ring John Fargher on 01-439 6299 (reverse charges) quoting Ref. J.F. 726.

CITY OF BIRMINGHAM POLYTECHNIC

The following vacancies exist in the Computer Centre which operates an ICL 1902S (32K) running under GEORGE 2 and MAXIMOP.

SYSTEMS ANALYST (S.O.1)

£4239-£4648 + £312 + 5%
A person with substantial data processing experience is required. A good knowledge of programming is essential and experience in an educational environment desirable.

CHIEF PROGRAMMER (A.P.5)

£3826-£4085 + £312 + 5%
Required for Systems Analysis, Programming, etc. Applicants should have a high degree of motivation, ability to work with the minimum supervision, and be capable of supervising a small programming team.

Further particulars and application forms (to be returned by the 15th August, 1977) from: The Personnel Officer, City of Birmingham Polytechnic, F. Block, Perry Barr, Birmingham B42 2SU. Tel: 021-366 8911. Ext. 218.

Systems Analyst

The Crown Agents are an independent public organisation operating as financial, professional and commercial agents for overseas governments, public authorities and international bodies.

The computer division is located at Sutton in Surrey and a Honeywell Level 66/DS is on order for delivery early next year to replace the 2 Honeywell 1200 series computers currently installed.

A systems analyst is required to take part in the design of a major new system for order processing and accounting which will require advanced file structures and extensive on-line facilities. Candidates should have at least 4 years' experience of programming and systems design, which should include on-line systems. Knowledge of Honeywell IDS and TDS would be an advantage. Starting salary will be negotiable up to £5,000.

For full details and application form telephone (01) 222-7730, ext. 3514, or write quoting MP/746/CD, to:

Crown Agents
The Crown Agents for Oversea Governments and Administrations, Appointments Division,
4 Millbank, London SW1P 3JQ

IBM OPERATIONAL VACANCIES

Machine	Shifts	Experience	Area	Salary
IBM 360	3 Shift System	TRAINEE	E.C.4	£1800
IBM 370/DS	DAYS ONLY	18 months +	W.1	£3000
IBM 370/145/148	3 Shift System	1 year +	Surrey	£3132
IBM 370/DS/VS1	3 Shift System	18 months +	Herts	£3300
IBM 370/135/DS/VS1	3 Shift System	2 years	Middlesex	£3500
IBM 360/50/DS/GRASP/POWER	4 Shift System	3 years +	E.C.1	£3600
IBM 370/DS	2 Shift System	2 years	E.C.3	£3800
IBM 370/125	3 Shift System	Shift Leader	E.9	£3700
IBM 370/DS/VS1	3 Shift System	Sen. Operator	N.W.1	£4000

ICL OPERATIONAL VACANCIES

Machine	Shifts	Experience	Area	Salary
ICL 1902A	3 No W/E	Jnr. Operator	W.C.1	£2700
ICL 1902A/Geo. II	2 Shift System	18 months +	Surrey	£3000
ICL 1904A/Geo. II	2 Shift System	18 months +	E.C.2	£3300
ICL 1904A/Geo. II	4 Shift System	1-2 years	E.C.1	£3300
ICL 1900A/Geo. II	DAYS ONLY	2 years +	S.W.1	£3400
ICL 1902S/Geo. II/II+	2 Shift System	Sen. Operator	S.W.6	£3700
ICL 1904A/Geo. II	DAYS ONLY	Chief Operator	E.C.2	£4000
ICL Systems 4	3 Shift System	2 years +	Middlesex	to £4100

MISCELLANEOUS OPERATIONAL VACANCIES

Machine	Shifts	Experience	Area	Salary
Burroughs 3600/3700	12 hour shifts	1 year +	W.1	£2800 +
Burroughs 1700	2 Shift System	to 1 year	S.E.1	to £3000
Datapoint 2200	DAYS ONLY	Sen. Operator	E.C.2	£3500
Olivetti D.E. 523/521	DAYS ONLY	1 year +	N.W.1	£3000

Above are just a selection of vacancies we have available

ajk Recruitment Limited
26 Chilworth Street
Paddington, W.2
01-402 0933/8

ajk

Project Leader

International Bank

Salary: c. £7,000 plus bonus and normal bank fringe benefits

Have you a strong computer banking systems background?
Are you working in an environment that limits your potential?
Would you like to work on on-line computer banking systems at a very early stage of development which can offer you significant experience?

If you answer yes to these three statements you probably would like to meet our client who is a very well known and established International Bank with offices throughout Europe and North America. Their computer systems group is well regarded and highly successful.

They now wish to bring in a computer banking specialist to act as Project Leader on a very important stage of the development of their new systems. Ideally you will have been in banking systems for between

three and four years in an on-line environment, will enjoy working on your own and will feel that you have a significant amount to contribute from your past experience. You will certainly gain more experience by working in this exciting environment. This is a job for someone who really can get things done, does not mind hard work and wants to make a genuine move upwards in his or her career.

If you are interested, please contact John Goldsmith. Ref. 669



John Goldsmith (Computer Recruitment) Limited
15 Buckingham Palace Road, London SW1. Telephone 01-828 5356. 24-hour answering service

JOHN GOLDSMITH (Computer Recruitment) Ltd.

We are looking for experienced Analysts & Programmers

The Sangers Group has a turnover of £80+ million with interests in pharmaceutical, photographic and grocery distribution.

Data Processing has a key role to play in the Group's projected growth over the next five years. Our Computer Centre is based in Huntingdon with 2 IBM 370/136's supporting 64 VDU's. In addition we have recently taken delivery of an IBM 3790 for use by our Northern Ireland subsidiary. The possibilities of Distributed Processing and on-line program development are under investigation for the future.

To help meet this challenge we require the following personnel:

Senior Systems Analyst— To £6000 Huntingdon

You must have the proven ability to make a major contribution to the design of an integrated system based on a distributed network. You should have at least 3 years experience of systems analysis, design and implementation in a commercial environment.

Systems Analyst—Belfast To £5000

Based in Belfast, you will be closely involved with the Northern Ireland users in the design and implementation of locally based systems on the IBM 3790. This is an ideal opening in business systems analysis for someone with 2 years programming experience including involvement in Systems Design.

Career progression with the Company is based on ability and is linked to a planned personal development programme. Generous relocation assistance will be provided where appropriate. If you enjoy working to high standards in a stimulating environment then contact:

Barry Townsend, Systems Development Manager

THE SANGERS GROUP LIMITED

Grammar School Walk, Huntingdon PE18 6NY. Telephone No. Huntingdon 57481.

Analyst/Programmer—Huntingdon To £5000

This is an opportunity to move into systems analysis by working on smaller systems from initial design stage through to final implementation. You must have had 2 years COBOL programming experience and been involved in systems design.

Programmer—Huntingdon To £4250

We are looking for a young COBOL programmer with at least 1 years experience (preferably IBM DOS VS). Knowledge of BAL would be useful. You will have the opportunity of progressing into analysis, software programming or senior commercial programming.

JBA

PL/1 Programmers

UK & Europe up to £7000+
Our client, one of the largest international software houses in Europe, has opportunities for programmers with experience of PL/1 on IBM OS systems, to work on the development of commercial applications.
The positions, although based in London, offer the chance to work in various locations both in this country and on the Continent. Candidates should have at least two years in PL/1 (or a combination of PL/1, ASSEMBLER or COBOL) in a commercial environment. Competitive salaries and excellent allowances.

Contact: Margaret Stevens

Senior Programmers/ Programmers

Herts. to £5500
Our client, a well established computer manufacturer, has a long-standing reputation in the areas of advanced satellite/RJE telecommunications and is currently involved in a number of developments including distributed processing, using micro processor technology. To assist in the development of these projects they require experienced programmers who have a sound background in basic software. This should include experience of networks, RJE, remote terminals and assembler level programming. Some knowledge of ALGOL/CORAL would be advantageous. An excellent opportunity for the d.p. professional.

Contact: Margaret Stevens

Technical Authors & Engineers

Attractive opportunities in many parts of the country

Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Software Specialists

Berkshire c. £6500
Our client, a leading software house, has vacancies for designers and programmers to work on the development of new software. Candidates must have at least two years' experience in the design & coding of basic software, preferably on compilers or operating systems. Knowledge of emulators, communications or teleprocessing would be an advantage.
Attractive salaries & large company benefits including relocation assistance.

Contact: Margaret Stevens

Software Programmer

Scotland c. £5600
A well known international company, manufacturing a highly successful product, seek an experienced software programmer with a background on IBM 370 under OS/VS1 and preferably advanced RJE facilities. Required languages are COBOL and ASSEMBLER. The system is used for a wide variety of company and management services, so knowledge of IMS and DL/I is highly desirable. Attractiveness of surrounding countryside is only surpassed by company benefits, prospects, and total relocation expenses.

Contact: Mike Creamer

BASIC+ Programmer

Berks up to £4800
A well established systems house, specialising in commercial turnkey applications, has a vacancy for a programmer with at least 12 months experience of BASIC+ on PDP11's. Knowledge of RSTS would be a distinct advantage. Challenging & professional environment. Excellent salaries.

Contact: Mike Creamer

MUNICH GERMANY COMPILER DESIGNERS & MINI-COMPUTER PROGRAMMERS £9K-£12½K

A leading German Software House has requirements for two compiler construction designers and implementors for a sophisticated mini computer. Experience in compiler design for mainframes will, however, definitely be considered. Mini computer systems programmers are also required. Top perks, relocation expenses, etc.

USA
Data Express House, Prospect Place
Heathfield Terrace, W4. Tel. 01-996 3883

Golden Vale Engineering

the largest organization serving the equipment needs of the dairy, meat, food, brewery and pharmaceutical industries in Ireland, invites applications for the following career opportunity from suitably qualified candidates.



PROCESS CONTROL ENGINEER

Required to head up department involved in design, specification analysis, programming and commissioning of relay and computer based logic systems for routing and control of dairy and related liquid food pipeline and process systems.

Degree or equivalent qualification with substantial experience including familiarity with the relevant languages used in this field essential.

Excellent salary and fringe benefits.
Apply in confidence to: Personnel Manager,
GOLDEN VALE ENGINEERING,
Limerick Road,
Charleville, Co. Cork.

ANALYSTS AND PROGRAMMERS

The Altergo Group already employs over 200 staff and is currently involved in a number of major projects providing DB/DC, IMS and PL/1 consultancy and applications expertise in the U.K. and overseas.

A number of vacancies exist for experienced systems analysts and programmers who want to work in a demanding and stimulating environment.

SYSTEMS ANALYSTS

Applicants should have a minimum of 6 years' DP experience (at least 2 years on IBM systems) and be able to demonstrate a distinctive competence in a particular business area, e.g. Stock Control systems. A knowledge of TP or data base techniques would be an advantage. Successful candidates will have the opportunity to progress to the business consultancy team.

PROGRAMMERS

Applicants must have at least 2 years' experience on IBM systems programming in PL/1 or COBOL. A knowledge of data base or TP techniques would be an asset though not essential as our education division provides regular training courses for our staff in these areas. Vacancies exist at all technical levels from programmer to team leader.

Salaries offered will be commensurate with experience in the range £4000-£6500. We also offer expenses and a bonus scheme.

Please write to or telephone Helen Glick at:

altergo

Altergo Limited
38/39th Square
London W1V 5DP
Telephone: 01-734 8681
01-646 0070 (after 7 p.m.)

Teesside Polytechnic HEAD OF THE COMPUTER CENTRE (Grade V)

Applications are invited from good Honours Graduates with substantial computing and managerial experience.

The Centre's present main computer, an ICL 1906E, is due to be replaced shortly by a large new multi-access system, to provide interactive computing facilities to all departments within the Polytechnic, including those operating specialist Undergraduate and Postgraduate courses in computing.

Salary: £7,887 to £8,080 per annum
Application forms and further particulars from the Staffing Section, Teesside Polytechnic, Middlesbrough, TS1 3BA, Cleveland County.

Systems Programmer

Our Client, a major national industrial organisation, has an excellent opportunity for a Systems Programmer in a small team based at a modern, well-equipped laboratory in London. The team is responsible for the maintenance of the George 3 operating system running on an ICL 1945 computer, and for the provision of support to research and engineering users throughout the organisation.

Future work will include development of software to allow the connection of non-standard devices to the ICL computer, and the successful candidate will make a significant contribution in this area.

Applicants should have relevant systems programming experience, but consideration will be given to graduates with sufficient computing experience. Important attributes are initiative and the ability to work with a minimum of supervision.

Conditions of employment are excellent, offering attractive salaries in a career-graded structure and qualifying for a contributory pension scheme.

Please write in the first instance, enclosing details to the address below. (Reference HQ84) must be quoted on your envelope. Enclose separately a note of any companies to which your application should not be sent.

Ronald Fairbairn, Everette Recruitment,
39 Graycoat Place, London SW1P 1SE

EVERETTE recruitment

RANK HI FI Systems Analyst

Rank HI FI who manufacture the famous Leak and Wharfedale loudspeakers have a vacancy for a Systems Analyst at their company in Idia, Bradford.

The position requires a person to analyse company requirements and to design both manual and computer based systems to meet these needs. They will also be expected to study existing procedures and recommend improvements.

It is essential that the person appointed has successfully completed a degree course or obtained an equivalent professional qualification. A minimum of 2 years' systems analysis experience and a year or more in the commercial field is also necessary for this post. Tact, patience and the ability to mix with a wide variety of people will be invaluable assets.

Commencing salary for this position will be around £4000, and relocation expenses will be paid, if applicable. Other benefits include free Life and Accident Insurance, Contributory Pension Scheme and discount on Rank Organisation products.

Men and women interested in this position should telephone for an application form to:

Miss J. V. Williamson, Personnel Officer, Rank HI FI, Wharfedale Works, Highfield Road, Idia, Bradford, BD10 8BF. Tel: Bradford 811131, Ext. 301.

RANK AUDIO VISUAL

OPERATIONS JOB CONTROL ANALYST

A challenging position for someone interested in progressing with a department which is shortly to install a Century 300 using the B4 operating system incorporating NCR JCL.

The main purpose of the job would be to direct the job control activities of the operations area at our Brent Offices.

Though you should preferably have experience in an NCR multi-programming environment, knowledge of other large

multi-programming systems would be considered. Full training will be given.

We operate flexible hours system, offering within limits a choice of starting and finishing times. Bonuses are paid bi-annually. A pension/life assurance scheme is in operation.

For further details contact Ted Young, NCR Ltd., 206 Marylebone Road, London NW1 6LY. Tel: 01-452 0050.

NCR

PROGRAM FUTURE!

City-Cannon Street

£5,000+

Major UK Bureau subsidiary of secure banking group are offering outstanding opportunities to young programmers for two new projects about to be launched. You will be part of a young team. Be recognised — improve your career prospects working on the latest hardware — developing commercial packages and enjoying a high salary & benefit package which includes: Generous holiday allowance, travelling expenses, health and dental insurance, company car, pension, life assurance, etc. If you have programming experience and are ambitious then call today! Tel: 01-568 9473

01-568 9473 (KINGSTON)

FREELANCERS

Guaranteed Higher Pay than in UK

and Overseas

If you have experience in any of the following:

IBM OS COBOL

ICL 1900 COBOL

HONEYWELL 6000 COBOL

Contact David Bailey on 01-402 9155, Mascof Computer Services Ltd., 60 Queens Gardens, W.2

EWBANK AND PARTNERS LIMITED

COMPUTER MANAGER

SALARY CIRCA £4,250 p.a.

We are a progressive company of Consulting Engineers with our Head Office in the centre of Brighton. Our work involves us in major engineering projects both in UK and overseas mainly in the fields of power generation, transmission and distribution, desalination, oil and gas industries including North Sea oil production platforms.

We require a Computer Manager who will be responsible for the day-to-day running of the Company's Prime 300 installation. The man or woman must be capable of writing and advising on programmes in at least Fortran and Basic. Applicants must also be able to create and maintain the software needed to enable the engineering, word processing and administrative staff to use the facilities in an effective and trouble free manner.

We provide excellent conditions of service with attractive salaries, profit sharing bonus scheme, pension and life assurance, permanent health scheme, luncheon vouchers and generous relocation expenses where appropriate.

If you feel that you have the type of experience we are seeking, please send your C.V. to Peter Hessay at Ewbank and Partners Limited, Prudential House, North Street, Brighton, Sussex BN1 1RW. If you require more details or would like an application form telephone him on Brighton (0273) 29731 — reversing the charges.

ewbank

London Borough of Enfield

Applications are invited for the following vacancies in the Borough Treasurer's Department.

Senior Systems Analyst

£5494 to £8055 (Post No. 218)

Applicants for this post should have a sound background in programming and systems analysis and some years' experience in Local Government or Commercial Data Processing.

Senior Systems Analyst

£5494 to £5797 (Post No. 222)

The successful applicant for this post will be responsible for advising and implementing software, in addition to supervising programming standards.

Programmer

£3694-£4072 (Post No. 225)

Applicants should have at least one year's programming experience preferably with ICL COBOL. The Borough's Computer Installation currently consists of a B4K ICL 1902T and is developing 7502 terminal systems.

Application forms are obtainable upon receipt of a foolscap stamped addressed envelope from the Borough Treasurer, P.O. Box 54, Civic Centre, Silver Street, Enfield, EN1 3XF. The closing date is 18th August, 1977. Reference No. ORA/878 and the post in which you are interested must be quoted in all correspondence.

A Step into management

Data-preparation—Wiltshire

Circa £3,750 per annum

If you have a background in operations/data control/data preparations, and are keen to gain management responsibility, and experience, this could be the job for you.

You will have control of a large staff operating a two shift system on C.M.C. 6200 key to disc equipment, plus two card punch machines, and will be expected to achieve excellent throughput to strict time schedules.

Applicants, male or female, should be 25 plus, preferably have experience of controlling staff, and be prepared for hard work and rewarding prospects.

Book club associates, jointly owned by W. H. Smith and Doubleday of New York, is the leading book club organisation in the U.K., and is growing fast, we are situated in Swindon, Wiltshire. In a modern office block within easy reach of beautiful surrounding countryside, there are the normal range of large company fringe benefits.

Please apply with brief details of experience to:

bc

Senior Personnel Officer
W. H. Smith and Son Ltd.
Greenbridge Industrial Estate
Greenbridge Road, Swindon,
Wiltshire, SN3 3LD
Tel. Swindon 36271, Ext. 327

Systems Analyst

Salary up to £5,500
N. W. Kent

OUR CLIENT IS

a large international manufacturing company, committed to major expansion of D.P. systems involving distributed processing, database etc. — presently using a Honeywell level 4 computer under CICS.

ARE YOU

an analyst of proven ability with a years plus experience of D.P. — a "D.P. professional" who can communicate at all levels — capable of working on your own initiative —

In addition to the competitive salary the company can offer the successful D.P. professional an attractive benefits package.

Please write with full details, quoting Ref. 895, stating the names of any organisation to whom your letter may not be sent, to: K. Whitfield.

Whites

Whites Recruitment Limited
72 Fleet Street, London EC4A 3JS
Offices: Amsterdam, Bristol, Glasgow, Düsseldorf, Leeds, Manchester and Southampton

F. W. WOOLWORTH & CO. LTD COMPUTER OPERATOR

(Scale to £3,500 inclusive of allowances)

Our operations team is looking for an experienced operator to join a well organised group within the company.

We are a large installation using ICL 1900 hardware and operating with GEORGE 2 system. The successful candidate will probably have at least 2 years' 1900 operating experience working with GEORGE 2 on a large site, and will have developed a high degree of responsibility.

Benefits include subsidised canteen facilities, company contributory pension scheme. Applications should be made to:

MR D. HILL
PERSONNEL MANAGER
F. W. WOOLWORTH & CO. LTD.
ROYAL BARN ROAD
CASTLETON, LANCASHIRE
TELEPHONE: ROCHDALE 47301

University of Kent at Canterbury Computing Laboratory

Shift Leader

An experienced Computer Operator is required in the Computing Laboratory to lead a three person alternating shift (08.00-16.00/16.00-24.00).

Salary scale £3,010-£3,522 (initial review) + £2.80 for each evening shift worked.

Application forms and further particulars may be obtained from M. R. Clayton, Assistant Registrar, The Registrar, The University, Canterbury, Kent CT2 7NZ (Tel. Canterbury 68822, Ext. 283), quoting ref. M77/7, to whom completed applications should be returned not later than 22nd August, 1977.

AMBER VALLEY DISTRICT COUNCIL

TRAINEE COMPUTER PROGRAMMER/OPERATOR

(Male or Female)

Salary within range £2,983-£3,323 approximately. Applications are invited for the above post from candidates with ICL 1900 operating experience, preferably with knowledge of the George operating system. The installation in the Finance Department at Heaton comprises an ICL 1901S with EDS 8 and paper tape. The major programming language is COBOL.

This is the second advertisement and previous applicants will be considered. Application forms are available from the Personnel Department, Amber Valley District Council, Field House, Chesterfield Road, Baldor, Derbyshire, S42 4PP, Baldor 2341, and should be returned by Monday, 22nd August 1977.

No One in DP

Unpaid view was earned through other duty and/or recognition

Over 3,000 vacancies have been advertised for you to help us fill them!

Whether you are a programmer, analyst, project leader, manager, scientific, technical or manufacturer, we have a vacancy for you.

Programmers —

U.K., Europe, Australia,
Canada £3,000-£20,000

EMS at present are desperately short of thousands of junior to senior Programmers worldwide experienced in Cobol, Assembler, PL/1, Plan, Coral and Basic. Clients throughout every town, city and county of the U.K. have requested EMS to urgently recruit thousands of additional programming staff. Equally, we have an ever increasing quantity of enquiries developing worldwide for Programmers with IBM, Honeywell and ICL experience. Recent extensive campaigns have indicated the enormous range of choice available to all Programmers. Whatever type of position you are interested in, either we have numerous suitable choices available, or we will find them for you. So many interesting opportunities exist only with EMS. All leading employers gain the majority of new staff from junior programmers to DPM's from EMS. Do not delay — register with EMS today.

Consultant: Selma Mills, Don Walklate, Anne Lennell.

Analysts —

U.K., Europe, Australia,
Canada £4,000-£25,000

Every week, dozens of experienced Analysts and Analyst / Programmers are placed in new positions throughout the U.K. with increasing quantities of candidates finding lucrative vacancies internationally via EMS. We equally need hundreds more Analysts urgently for positions with Banks, Consultancies, Distributors, Engineers, Freight Companies, Insurance Groups, Stores, etc. You choose any location in the U.K., Europe, Middle East, Australia or Canada and let EMS get results for you. Our hundreds of vacancies advertised during the last few weeks indicate the enormous range of opportunities available. Help us resolve the situation, send us your profile and that is one job less. If you have 1,000 associates, send theirs to do 1,000 trends a real favour.

Consultants: Don Walklate, Selma Mills, Anne Lennell.

Project Leaders, Managers —

U.K. & Worldwide
£5,000-£30,000

EMS are placing large, increasing quantities of Senior Analysts to Managers, salaries £5,000 to £25,000 nowadays. Demand for Project Leaders in the £5,000 to £7,000 category is running on an unparalleled level. With so many new users creating their first installations, or upgrading to a larger capacity installation, experience is perhaps at least starting to command attractive additional premiums. EMS are now starting to develop the most comprehensive data bank of junior and senior managerial DP staff available in the U.K. today. Few of our managerial vacancies are ever advertised with the great majority of vacancies being filled by our data bank candidates. Complete the EMS profile and stay informed of all future suitable career opportunities in the location of your choice. Remember — EMS are in touch with most installations throughout the U.K. each week.

Consultants: John Wood/Neil Bradley.

Scientific, Technical & Manufacturers

U.K. £3,500 - £15,000

Computer manufacturers ranging from major international groups, to specialised mini/micro turnkey support companies, have large, increasing quantities of vacancies to cope with substantial growth plans during the coming years. Vacancies range from Graduate Trainees to Systems Programmers, Software Development Designers/Programmers, right up to experienced Senior Managers. Locations include London, Home Counties, Midlands, Staffs, Manchester and Scotland. For top positions with all the leading manufacturers complete the EMS application form without delay.

Consultants: Niall Bradley/John Wood

Senior Consultants

Kuwait's leading consultancy requires top Analysts with previous IBM programming experience to take senior project roles supporting a number of major clients. Knowledge of either Inventory Management, Accounting, IMS, CICS would be especially advantageous. Candidates should possess the ability to train and supervise client staff. Any knowledge of banking procedures will be welcome but not essential. Applicants for Senior consulting vacancies should have recent IBM / DOS experience, comprehensive knowledge of third generation hardware, able to consider blocking factors, capacities, number of access approaches to Data storage and retrieval in file designing. Successful candidates will have co-ordinated or determined the design of at least two complex systems. Equally, an advance knowledge of DTF structures and understanding of relationships and their use is desirable. At least three years' previous ANS COBOL with some Assembler will be sought in order to review coding samples, teach coding techniques and dump reading.

Consultant: John Wood

Programmers—Cobol & Assembler

Candidates are required for a leading commercial organisation. We are seeking a good knowledge of COBOL or Assembler using indexing, the sort verb and a familiarity with modular programming techniques. Additionally, we seek broad knowledge of file organisations, Programming spec., Writing, Documentation development, Direct Tuning Environments, IBM System utilities and DOS Dump Reading. Equally, a basic knowledge of on-line programming would be helpful. Candidates should be single, or married with not more than 1 child and aged 23 to 30. Attractive working conditions in air conditioned premises exist for successful candidates.

Consultant: John Wood.

IBM Candidates — D.P.M.'s, Analysts/Programmers, Programmers

EMS currently have a large quantity of new vacancies available in Kuwait. These range from Senior Managerial roles, down to experienced COBOL or Assembler Programmers. Clients include Consultancies, Banks, Car Distribution Groups, Finance Companies, Oil Producers and State Departments. All experienced IBM staff, of any level interested in attractive financial rewards and the opportunity of working in one of the Gulf's most advanced and interesting regions, should contact EMS without delay. Please note, however, that a maximum of 2 children will apply to all future candidates. For top employment opportunities in the Gulf, complete our applications form and leave the rest to EMS.

Consultant: John Wood.

Urgent 60 Vacancies E&S Honeywell Group £4,000-£7,000 PLUS O/T PAY & EXPENSES

Analysts & Programmers to £7,000 + +

EMS currently have the largest Honeywell U.K. Consulting Support Division with large scale investment plans in progress to develop a sophisticated and diversified subsidiary support company. At present, we have a substantial range of support contracts throughout the entire U.K., with further European involvement during 1978. All experienced Analysts and Programmers seeking the opportunity of gaining first hand career experience in a wide variety of commercial and industrial installations should consider our Consulting Support Division. Our confidence is so positive as to invest £300,000 on the new release of micro and mini computers. For job challenge, futuristic Honeywell Support Projects, think EMS: one of the U.K.'s largest systems and programming employers. We urgently require at least 50 more support staff. Contact us for immediate interviews throughout the U.K. or complete the form and we will contact you the day we receive your application.

Consultant: Denis Filby

IDS & TDS Programmers To £7,000 p.a.

Our large Consulting Support Division has urgent needs for experienced IDS or TDS Programmers to work on a wide variety of development projects throughout the U.K. and Scandinavia. Clients include Distributors, Engineers, Chain Stores and Distribution Groups and Manufacturers. Equally, interesting TDS vacancies are available with major clients for development of distributive network processing. Career development prospects are unlikely to be rivaled elsewhere in the U.K. Join EMS and obtain the most advanced Honeywell training support in the U.K. with regular Level 6 package training seminars. Expenses will be paid where appropriate for staffing our Southern or Midlands regional teams. Attractive salaries and expense allowances provide an excellent financial package. For multiple client involvement, think EMS. Think success and apply urgently for early meetings.

Consultants: Denis Filby/John Wood

Sales Consultants—Turnkey Systems & Consulting up to £12,000

The enormous success of our Honeywell Support Group has now necessitated a further strengthening of our marketing base to cope with the ever increasing product range of services. We currently have a large quantity of outstanding leads with substantial market development for experienced Sales Consultants. We envisage career Salesmen capable of handling a dual project range of Consulting Support Systems and Turnkey Systems. EMS will be developing a large quantity of application support packages in order to provide Sales staff with a very competitively priced product and full, proven supporting facilities. Equally, the Honeywell Consulting Support Division is currently being substantially expanded to ensure effective follow up on our early new marketing successes. All candidates must be capable of presenting effectively support proposals at DPM and Board level in a professional manner and be able to justify the level of salary plus commission commensurate with a top consultancy.

Consultant: John Wood

27 NOEL STREET, LONDON, W.

oyez**PROGRAMMER/ANALYSTS**

Oyez is a group of companies employing 1,700 people and operating in eight countries. In the U.K. it consists of two specialist printing companies, a publishing company, a conference company and other companies supplying stationery, business equipment and commercial services to a wide market. Oyez Services Limited is the subsidiary of the Group which specialises in providing a range of computer services to commerce and the professions.

Considerable expansion of both Oyez Services' on-line computer packages and the internal computerisation of other companies in the Group is taking place. In both cases systems are being developed to run on PDP 11/35 minicomputers under RSTS/E. The programming language used will be Basic Plus and extensive use will be made of telecommunications and on-line techniques.

Vacancies
Exist for

FOUR PROGRAMMER/ANALYSTS AND ONE O & M ANALYST

Most of these positions are within the Group Management Services Department, the others within Oyez Services Limited.

Programmer/Analysts should ideally be familiar with PDP 11/35s, RSTS/E and Basic Plus, but experience of other minicomputers and similar operating systems and languages will be considered. Experience of commercial applications is desirable.

The salary offered will depend upon relevant experience and skills but will be in the range of £4,000 - £5,500 per annum. The range of other benefits offered by the Group include a profit-sharing scheme, free life assurance, contributory pension scheme and use of Group sports facilities.

The O & M Analysts will be involved primarily in the early phases of system investigations. Some relevant business experience is required but additional training will be given. The starting salary will be around £3,500.

Applications please in writing to Mr. M. C. P. Fabosch, or telephone 407 8055, extn. 216.

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Up to £3,400 p.a.

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Up to £7,500

Price Waterhouse & Co are seeking a systems support specialist to join a technical support group which they are about to establish. The specialist will be responsible for:

- Developing, maintaining and supporting computer packages for use by a wide range of clients both in the UK and overseas
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- Developing other computer assisted audit techniques and advising on the technical aspects of auditing advanced computer systems such as database and on-line systems

Applicants should be able to demonstrate a high degree of technical competence, should have at least 3 years' DP experience and should have proven expertise in:

- Developing and maintaining commercial applications systems and software
- Programming in COBOL
- IBM operating systems and JCL

The technical support group will be based in modern offices at London Bridge. The successful candidate will work closely with other specialists in the technical support group, with computer monitors and with data processing consultants from the firm's management consultancy.

The commencing salary will be up to £7,500 per annum.

Please write in confidence for a job description and an application form to: Price Waterhouse Associates, 32 London Bridge Street, London SE1 9BY quoting M25/811.

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Analysts for min. 6 mth. contracts in London, Essex, Bucks and Hants.
Analyst/Progs with 2 yrs. systems exp. plus good OS COBOL — Hants.

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Analyst/Progs. with good IBM programming exp. + 2 years system — IMS and/or CICS experience extremely useful.
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dp

Customer Service Engineer for Iran and Saudi Arabia

Raytheon Data Systems is a manufacturer of mini-computers and terminal oriented data communication systems. Raytheon International Data Systems is responsible for the marketing, sales and service of all its products in Europe, the Middle East, Far East and Africa.

For Iran and Saudi Arabia we are seeking additional men as Customer Service Engineer. The person we require should have a good command of the English language and a thorough knowledge of the servicing of computers and telecommunication equipment.

He will be working in close

collaboration with the Airlines in Iran and Saudi Arabia. This position requires a person who holds a Bachelors Degree in Electronics or IITS Diploma.

We offer an excellent salary and working conditions to the right applicant. Unmarried applicants are preferred.

For any further information, please call or write to: Raytheon International Data Systems, for the attention of Mr. J.O. Verschuur, 53 Spaklerweg, Amsterdam, The Netherlands. Telephone: 020-930787 Ext. 33.

RAYTHEON

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SENIOR ANALYST PROGRAMMERS ANALYST PROGRAMMERS SYSTEMS LECTURERS

**Salaries circa £5,000 p.a.
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Our client, a privately owned company that supports and sells an integrated series of products being amongst the most successful software products available within the United Kingdom. These products enjoy acceptance in many major mainframe installations, and are generally regarded as being the most complete and best supported in their particular application area. Development of a further product to be supplied by the company, has led to the necessity of recruiting further KEY PERSONNEL to join the company September/October, 1977.

SENIOR ANALYST PROGRAMMERS/ ANALYST PROGRAMMERS

Candidates for the above positions must possess:

- a knowledge of PLAN and familiarity with 1900 series hardware or a knowledge of ASSEMBLER and familiarity with IBM 370 series hardware.
- preparedness to travel
- the necessary personal qualities and attitudes needed to work in close contact with clients.

SYSTEMS LECTURERS

Candidates for these positions should possess:

- a formal computing background, combining an understanding of systems user implications
- the ability and confidence to be able to project themselves; frame and devise education material for seminars with clients.

THE COMPANY OFFERS EXCELLENT (ABOVE AVERAGE) FRINGE BENEFITS INCLUDING: Interest free car loans/substantial travelling allowance/four weeks' holiday/11% non-contributory pension scheme/free BUPA/interest free personal loans/substantial relocation assistance, etc.

These vacancies are of an urgent nature and interested candidates should contact, without delay:
REG HEATH, 021-236 3781

REF. NO. 77/08/1

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LONDON 01-935 0671 FREEPOST 6
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MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

ANALYSTS and PROGRAMMERS New Projects

C. LONDON

The continuing demand being placed upon our client's development resources has created the need for additional Analysts and Programmers to develop a range of interesting systems from feasibility to implementation.

Analysts will be given total responsibility for systems which will entail leading small teams of Analyst/Programmers and Programmers, and involve considerable user contact. Programmers will join small project teams within which they will be required to undertake design and specification duties.

Candidates should have been involved with the development of major commercial systems. Analysts should have led, or have the potential to lead, small project teams. Programmers should have sound COBOL experience. Conditions of employment are excellent and the successful candidates can look forward to a progressive career within an expanding environment.

£4,800-£8,500

LEAD PROGRAMMER

C. LONDON

A senior programming position exists for a person with both programming expertise and the potential to lead a small team of Programmers.

You are probably functioning as a Programmer or Senior Programmer currently and are now seeking the opportunity to use your technical knowledge in a role where you can combine it with your ability to guide others. The team will be involved in the design and programming of sophisticated on-line and batch systems covering a variety of commercial and financial applications. Other responsibilities include advising on training and standards.

It is essential that you have ASSEMBLER and/or COBOL experience. Knowledge of IBM 360/370, DOS, CICS or Database techniques would be an advantage. The company offers a first-rate career path, initially in a more specialised technical capacity or via systems analysis.

c. £4,800

SYSTEMS PROGRAMMER

KENT (Excellent Relocation)

£5,000-£6,000

Our client's data centre is based on an IBM 370/158 running under OS with communication links to various sites in the UK and Europe.

Candidates for the position of Systems Programmer will be competent in IBM Assembler with a minimum of two years' systems programming on IBM hardware including one year with OS/VS.

Any OS/VS1 experience including RES and general OS telecommunications would be an advantage, as would the ability to program in FORTRAN and/or COBOL.

The successful applicant will function as part of a small team in a relaxed and friendly highly professional environment.

Conditions of employment are excellent and include pension and sickness schemes, free life assurance, subsidised restaurant and sports and social facilities. There are four weeks' holiday, flexible working and a generous package is offered to those wishing to relocate.

SYSTEMS ANALYST

C. LONDON

UP TO £8,000

Our client is developing a new system later this year using on-line data collection terminals and VDU's via a front end mini to an ICL machine. They are seeking an analyst with at least 18 months' analysis experience, preferably having been responsible for at least one system from design to successful live running.

This position is based in the West End, very conveniently situated for commuters to both Waterloo or Euston stations. You will be working flextime and will be paid an excellent salary with generous fringe benefits as would be expected from a major international company.

Please telephone for a confidential
discussion or write to:
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01-353 5868

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MINI AND MICRO REAL TIME SYSTEMS

Hertfordshire

Salaries negotiable ££6,000

A well renowned international group is expanding fast in the field of banking terminals and financial security systems and need a number of experienced Engineers to join their Hertfordshire location.

Systems Engineers are required to establish and document systems requirements and specifications, to undertake feasibility studies and co-ordinate projects including commissioning of systems and final acceptance of prototype systems.

The applicant must possess HNC with endorsements in Electronics and ideally be an associate member of I.E.E. or equivalent body.

A minimum of 3 years' background in mini computer systems, programmed in ASSEMBLY language is necessary and hardware and software design experience preferred. Micro processor knowledge and project control experience would be ideal.

Please reply to our CROYDON office quoting ref: CW52-75.

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19, PARK STREET, CROYDON, CR9 1TN FAULKNER STREET, MANCHESTER, M1 4YD

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LONDON AND MANCHESTER

CREDIT LYONNAIS

a leading French Bank, long established in London, has recently installed a 256K IBM 370/125/2 which is currently being used on batch systems and to which the bank's 16 existing terminals will shortly be connected for on-line applications.

Two additional staff are required to work on a 2-shift, 5-day week system. Salaries are inclusive of shift allowance and there are attractive fringe benefits, including L.V.'s and an annual bonus.

SHIFT LEADER

with at least 2 years' experience, including 370 operation under DOS/VS. A starting salary of around £3,750 is envisaged.

COMPUTER OPERATOR

with at least 1 year's experience, including 370 operation under DOS and, preferably, VS. A starting salary of around £3,250 is envisaged.

Applicants for both posts should have a mature and responsible attitude to their jobs and be able to work well in a small team.

Please apply in writing to:

Mr. H. Young
Personnel Manager
Credit Lyonnais
P.O. Box 81
89-94 Queen Victoria Street
LONDON EC4P 4LX

RESEARCH POST IN THE SOCIAL RESEARCH UNIT

(Full-time or Part-time)

Supported by the Medical Research Council, for a person with computing experience to deal with programming and data handling work on projects concerned with social factors in the onset and course of psychiatric disorder in women. Initial salary for a full-time appointment would be within the gross range of £3377-£4445 p.a. according to experience. Applications with C.V. details to Senior Assistant Secretary (Personnel), Bedford College, Regent's Park, London NW1 4NS.

BRUNEL UNIVERSITY LECTURER IN COMPUTER SCIENCE

Applications are invited for the above post from candidates with a good honours degree and research or industrial experience in computing. Preference will be given to those with experience in one of the following areas: data processing, systems analysis, databases. Salary within the first seven points (£3356-£4807) of the Lecturer scale £3156 (£6155 plus £450 London Allowance). The post is to be filled as soon as possible. Application forms and further particulars from Assistant Secretary (Establishment), Brunel University, Uxbridge, Middlesex, UB8 3PH, or telephone Uxbridge 371188 extension 49.

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SYSTEMS CONSULTANCY U.K. AND OVERSEAS

The Company is a world leader in the development and application of a specialist range of systems for client companies and governments. Currently projects are being pursued in South America, the Middle East, the Far East and the U.K. They wish to strengthen their small systems team by the appointment of a young professional who will be required to act as the D.P. Specialist within a project group responsible for the design and implementation of systems in U.K. and Overseas.

This is an opportunity for a true professional to extend his/her experience working independently on the design of commercially orientated computer systems within a highly successful company. Proven computer systems design is required preferably with a financial bias and experience of I.B.M. equipment. It is envisaged that the successful candidate will command a salary in the range of £5,500 to £6,500 together with an attractive range of major company benefits.

An applicant's name will not go forward to our client until he or she has had a full briefing on the job position and the company environment and until the applicant has given consent. Please send a summary covering employment history, achievements, current remuneration and age to:

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PROGRAMMERS

Join one of our project teams expanding existing systems and paving the way for enhancements to our current hardware. Segas with 14 million customers and 10,500 employees is building one of the most progressive computer set-ups in the country. It has been designed to meet the needs of Britain's Gas industry — one of our richest natural resources.

A 1M-byte 370 145 is currently installed running a wide range of batch and teleprocessing applications under OS VS1, CICS and VTAM. An additional 2M byte 370 148 is on order for delivery later this year to cater for the first phase of a major expansion. This will involve the implementation of a large terminal network serving the Customer Accounts and Engineering functions, and the development of conversational facilities.

We need:—

SENIOR PROGRAMMERS

Up to £5787 per annum. A senior position requiring a minimum of 3 years Cobol experience. In addition a knowledge of OS VS1 and/or Assembler would be an advantage.

PROGRAMMERS

Up to £4431 per annum. For these posts we are prepared to consider professionals with a minimum of 18 months post-training programming experience.

- ★ Salaries include Metropolitan Weighting and 1976 Salaries Supplement etc.
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- Write giving full details, within 7 days, and quoting ref. F.2961 to:—
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Up to £5,000 p.a.

To take charge of an expanding computer facility and maintain the efficient operation of our N.C.R. Century 261 with 385K memory, high speed tape decks, 668 discs and on-line V.D.U.'s, N.O.F. and cassette input.

Experience with N.C.R. Century series equipment is essential, preferably using 83. A Shift Leader with more than 3 years' experience will be considered. Shift working is not required, although the person appointed will be responsible for three years working shifts during 5 days a week.

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SOFTWARE DEVELOPMENT

Conveniently located just outside London, the software development group of a leading mini-computer manufacturer is being expanded.

Environment and facilities are first-class; all development work is done on-line using dedicated in-house systems.

The existing project teams are youngish (25-35), mostly graduates, and contribute to a lively and stimulating atmosphere.

Typical large-company benefits are available and assistance with relocation expenses may be granted. A range of different projects are either established or due; hence the following opportunities:

DBMS DESIGNER

£ NEG

In this post you will make a positive contribution to the design of a database system. Your experience will include implementation of a DBMS package or a database system. A knowledge of access methods is especially important, along with very good Assembler experience.

RW 31/1

COMPILER DESIGNER £ NEG

This is a key position to lead the development of a COBOL compiler. You must have been responsible for the successful implementation of a commercial compiler from scratch. You must also be able to lead, advise, and guide a team of seven or more.

RW 31/2

For these two key positions salary and terms will not present a problem for the right people.

TP SYSTEMS SPECIALISTS

to £7500

Two key posts are to be filled on this project. You should have a first-class in-depth involvement in either transaction processing, telecommunications, or operating systems software. In addition, experience on the design of operator interfaces and pre-processing systems would be an advantage.

RW 31/3

COMPILER SPECIALISTS

to £7500

Involvement in compiler design and development preferably for COBOL or RPG II is a must for these positions. You must also have significant team leadership experience in a product development role and appreciate the importance of systems testing and quality assurance.

RW 31/4

DBMS DEVELOPMENT SPECIALIST

c £6000

Extensive Assembler experience, especially in the DB/access methods area, is the basis for this position. You will work on a new DBMS development. Any additional expertise in T/P or programming languages would be a plus.

PROGRAMMERS to £6000

Programmers are required on all the projects referred to here; the basic requirement is good Assembler experience on any computer. If in addition you have some knowledge of, and empathy with, software constraints and requirements, you will be highly successful in this software development group. This is a first-class opportunity to develop your skills and embark upon a rapid career development path.

RW 31/6

hutchinson-scoggins recruitment
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DISTRIBUTED PROCESSING LIVERPOOL

Our Clients, a major force in the food industry, are shortly to install new Honeywell hardware worth in excess of 2 million pounds. Their equipment consists of a dual Honeywell 6805 system, based in North Liverpool, supporting 44 level 6 machines in locations throughout Great Britain. They are currently involved in development of sophisticated integrated systems utilising the latest Honeywell hardware and software, including T.D.S. and I.D.S.

Business Analysts

He/she will be involved in individual applications. They will be responsible for producing systems specifications which fit into the overall integrated system. Travel to user sites throughout Great Britain is envisaged, combined with overall responsibility for the successful implementation of the project. Previous Honeywell experience is not necessary, but an understanding of the Food / Bakery industry is advantageous.

Systems Software Designers

Involvement in overall design as well as liaison with applications teams to integrate projects. Applicants must have GCOS experience and a knowledge of one or more of the following would be advantageous:

TDS/IDS
NPS
Level 6 DST

APPLICATIONS PROJECTS TEAMS Designers/ Programmers

A wide range of programming skills are required for this exciting project, including Programmers, Senior Programmers, and Design / Programmers. Applicants should have experience of one or more of the following:

COBOL (Honeywell preferred)
ASSEMBLER (Level 6)
G.MAP

Project Leaders

He or she will take control of individual projects ensuring they are correctly designed and interfaced with an overall system. They will be responsible for ensuring that the systems are produced on time, and in liaison with Systems Software Designers fully utilise hardware facilities.

Systems Designers

Responsibility for interpreting business analysts specifications into working integrated systems. Ideally, candidates should have a good understanding of Honeywell 6, 68 software and/or hardware.

The positions are based on the outskirts of Liverpool, within easy access of coastal areas and the Lake District. Initial interviews will be held in Manchester, Birmingham and London.
CONTACT: DAVID WADE 061-833 0676

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LONDON 01-935 0671 FREEPOST 6
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Major Opportunities in DP for Analysts and Programmers

The Company
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The Installation
We currently have a 1Mb IBM 370/145 operating under OS/VS1 and are actively making use of the latest distributed processing concepts using minicomputers, data base and data communications techniques.

We are looking for
Analysts and programmers who have a minimum of 2 years DP experience preferably in a manufacturing environment. Knowledge of data base and on line systems would be an advantage. Programmers should have a sound knowledge of PL/I, Assembler or Cobol.

We are offering
• A challenging and exciting environment with good career potential
• Attractive Salaries
• Employee car purchase plan
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Applications should be forwarded to:
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King Street, Leyland, Preston,
Lancs PR8 1SN.
Telephone: Leyland 21400 Ext. 73



University of Bradford COMPUTER OFFICER

Applications are invited for the above appointment in the Schools of Studies in Computing and Environmental Science. The duties will consist of providing programming and technical advice in connection with teaching and research programmes. Applicants should have a degree or equivalent qualification and previous programming experience is essential. Salary on scale Computer Officer £2004-£4611 p.a. (under review). Application forms and further particulars are available from the Personnel Office, University of Bradford, Richmond Road, Bradford BD7 1DP, by writing or telephoning Bradford 33466 ext. 252.

contract

IBM Assembler programmers required for 3-month contracts in NORWICH starting during August.

EXCELLENT RATES (extra for CICS experience).

+ Hotel expenses + Flexi-time + Free Lunches

dean associates Tel: 09237 79617

CHIEF SYSTEMS ANALYST

c. £5,000

Commercial organisation with ICL 1901T, EDS 60s and VDUs is shortly embarking on an exciting development phase and seeks applicants for the above post.

Ideally you will have several years' total commercial systems experience together with a COBOL programming background. The position also entails deputising for the D.P.M. in his absence.

Application forms will not be used so please send concise relevant details to:

C. C. Lester, Finlay and Co. Ltd.
Collingwood House
Mercers Road
London N19 4PL

WEST HERTFORDSHIRE COMPUTER JOINT COMMITTEE

Data Processing Manager/ess

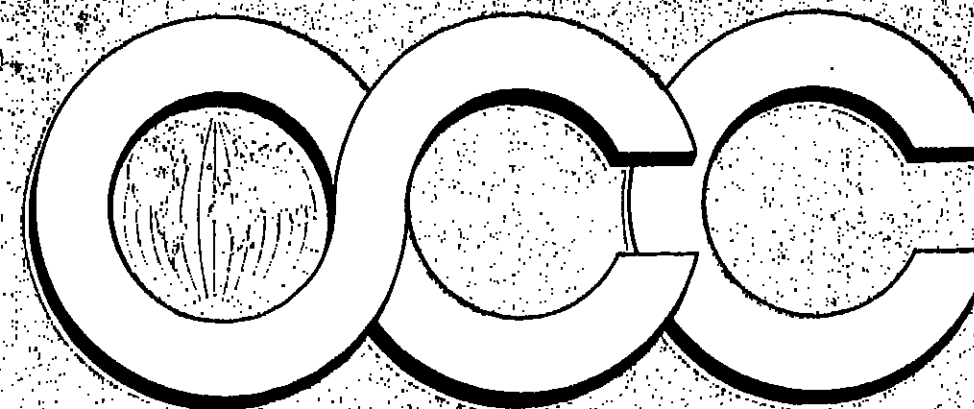
Grade: Principal Officer 2 (6-10)
£6729-£7407, plus £502 supplement and
£180 inner fringe allowance, per annum.

Applications are invited for the above post from persons with wide experience of Local Government computer applications. The IBM 370/126 computer installation is located at the Town Hall, Watford and provides data processing services for three local authorities in Hertfordshire. RJE terminals are to be installed and the successful candidate will be expected to develop both new and existing systems. A thorough working knowledge of RPG 2, Assembler and DOS/VS is necessary.

Commencing salary dependent upon qualifications and experience. Temporary assistance with housing accommodation available in appropriate cases.

Application forms and full details of appointment obtainable from Mr. Jeffery, LL.B., Clerk of the Computer Joint Committee, 16 St. Peter's Street, St. Albans, AL1 3LU - St. Albans 66100. Extension 253, to whom completed applications should be sent. Closing Date - 30 August 1977.

16 Bedford Row
London WC1R 4EB
01-242 9356
Telex 21120



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computer personnel limited



WESTINGHOUSE

WEST COUNTRY & BERKSHIRE

The Company

Westinghouse Brake & Signal Company Limited manufactures a wide range of electrical, electronic and mechanical products and systems, using modern techniques.

The company is structured into autonomous manufacturing Divisions. Two divisions, each one with an independent software group, are currently recruiting.

Signal & Mining Division

is one of the largest Divisions within the group, responsible for the complete design, manufacture, installation and commissioning of Railway Signalling and Mining Control Schemes in the U.K. and overseas. In view of the increasing proportion of Computer based equipment contracts, vacancies are available in the following areas:

Real Time dedicated rail system monitoring
Real Time Software Development
Engineering support Software

The main computer configuration is based on Hewlett Packard 21M series Mini computers used singly or as a network of mini computers.

Real Time Programmers & Analyst Programmers

To £4,200

We are looking for a minimum of 1 to 2 years' ASSEMBLER experience on mini computers. Applicants should have the ability to design programs and must be efficient coders. They will work on implementation and systems.

We would also like to hear from Real Time Assembler Programmers with systems experience. Ref. 562/CW.

Systems Analysts & Project Leaders

To £6,000

This Division has requirements for experienced System Designers with supervisory experience to take full responsibility for Systems Design and Project Leader duties, such as staffing. Ref. 563/CW.

Automation & Controls Division

specialises in electronic computer based systems for the control and distribution of gas, oil, water, electricity and also deals with numerous computer control systems for industry and engineering purposes. The Software Group is supported in all its development activities by inhouse DEC computer configurations. The complete software systems operates under the control of a special purpose Westinghouse executives for systems using PDP 11/04 and DEC executives RSX 11 M for PDP 11/34.

Analyst Programmers & Systems Analysts

To £4,800

A number of vacancies exist in this division for Programmers or Analyst/Programmers or Systems Analysts with a minimum of 1 to 2 years' experience in High level languages (FORTRAN, CORAL, RTL). A knowledge of RSX 11 operating systems would be advantageous.

Real Time Systems design experience in Industrial Process Control, Telecommunications, Message Switching and industrial tele-control fields would be relevant. Ref. 564/CW.

There may also be opportunities at a later date for PROGRAMMERS with MICROPROCESSORS experience. Ref. 567/CW.

The location:

Applicants to all the above vacancies will be given a choice of base at Chippenham (Wiltshire) or Wokingham (Berkshire).

Chippenham is the company's main site. Only 1 hour 10 minutes from London by fast train and 12 hours by car, with the M4 motorway (exit 17) nearby. It is also within easy reach from the South Coast and the Midlands and only half an hour from Bristol. It is a very pleasant part of the West Country and offers reasonably priced housing (three bedroom house from £10,000).

Wokingham is a newly acquired smaller site offering an alternative work base near Reading and London.

Opportunities also exist for overseas contracts and overseas travel. Salaries are negotiable according to qualifications and experience and location. A very attractive relocation package is available where appropriate, as well as the usual large company benefits.

To apply for any of the above positions or for further information, please telephone or write to: **Recruitment Note on 01-242 9356, if it would be more convenient to telephone in the evening or at weekends, please telephone 01-274 6372.**



John H. Jones

Consultants up to £16000

Analyst Programmers

up to £110000

Holland

The Market Leader in the design and implementation of software systems in Data Communications wish to expand their Project Teams in Holland. There are a number of positions available from junior programmer/analysts to senior Project Managers. Special attention is paid to providing opportunities to advance your career both technically and managerially within a highly professional environment at the forefront of Software innovation.

It is important to have had experience of Data Communication software some of which should have been using Mini Computers. Major projects actively engaged upon include Real-time (process oriented) systems, on-line applications, message switching and computer networking.

Every effort will be made to ensure that relocation to Holland is as smooth as possible. All necessary expenses are paid and Hotel accommodation is provided on arrival. Career prospects and personal security are very good indeed and a high salary will be negotiated with you in the above ranges.

Candidates should telephone
01 499 9214 or 0103120 461854

CW30/1 AMSTERDAM/MAYFAIR

Systems Support

c.£6500

Dublin

We have been retained by a leading International Computer Manufacturer with a marketing and production facility in Ireland. Due to the successful sales of the new range of multiwork station computers and terminals, it is necessary to recruit SYSTEMS SUPPORT SPECIALISTS.

As the successful candidates will have total responsibility for the design and the development of business systems at their new user installations, five years experience of designing and programming commercial systems is desirable.

The company offers candidates the opportunity to take on further responsibility, work with interactive hardware and contribute to their successful sales effort. Excellent fringe benefits include, bonus, very high mileage allowance and relocation expenses.

CW30/8 DUBLIN/MAYFAIR

Rural Kent

Our client company is one of the most respected companies within the area and has achieved a considerable growth record over the past few years.

The premises are modern and NOT based on an industrial estate, but situated in a pleasant rural landscape, and within striking distance of a mainline station. There is also the opportunity to use the company bus if necessary.

In addition to an excellent salary, successful candidates will be given full relocation expenses (where applicable).

See below for details of the current team and the company bus if necessary.

c.£6000 + relocation expenses

The current team are involved in sophisticated warehouse stock control and financial/accounting projects.

Applicants applying should have three years Systems background which should include strong contributions to at least one major project. A programming background of RPG 11 and ASSEMBLER is essential and experience of motivating and leading a small team of programmers.

See below for details of the current team and the company bus if necessary.

c.£4500 + relocation expenses

Two years RPG 11 and ASSEMBLER background is required for the above applications area.

Programmers wishing to enter into Systems Analysis at a later date will find this position of particular interest for their career progression.

CW30/8 KINGSTON

1900 COBOL Programmers

up to £7500

Home Counties

Are you looking for good sound training on and off the job? Our client is looking for ambitious programmers to work as part of a project team with a possibility of leadership; talent is more essential than experience.

So if you have any one or more of the following skills:

- * On-line application
- * Structured Programming
- * DRIVER/TP Monitors
- * MAXIMOP
- * FILETAB/FTL 6
- * Database Techniques

and live or will relocate (with generous relocation expenses) to BEDFORDSHIRE, ring for confidential discussion or write without delay.

CW30/10 KINGSTON

Contracts

Holland/Amsterdam/The Hague

CCC BV, based in Amsterdam, have been requested by two of the biggest computer manufacturers and a sophisticated software house, to fulfill a number of opportunities involving the following:

Mini Assembler Programmers with INTEL 8080/PDP 8/PDP 11
RPG 11 Programmers Systems 3, Systems 32, 2903, 2904
Programmers experienced in system conversions, COBOL, RPG 11
ICL new range application programmers, system programmers and systems analysts.
IBM, OS, PL/1, DL1
IBM, DOS, CICS, ASSEMBLER and/or COBOL
IBM System Programmer, OS, VSI, VS2 and MVS

You can expect interesting assignments, and a very high salary and in some cases a permanent position at the end of your initial assignments.

Speed is of the essence, so please telephone our Mayfair office, 01-499 9214 as soon as is convenient, or our office in Amsterdam, 010-3120-461844

CW30/4 AMSTERDAM/MAYFAIR

Programmer Analysts

£4,500 - £6,000 pa + relocation expenses

One of Ireland's leading companies has recently commenced development on an On-Line interactive computer network.

We wish to recruit on their behalf, top class programmer/analysts to come in at the initial stages of this development. The job involves the design and programming of On-Line Order Entry & Enquiry Systems. We are looking for people with at least 2 years BASIC + under RSTS, backed up by additional systems and programming experience. Most junior posts are available for less experienced people.

The company offers above average salaries and an opportunity to join an expanding operation with a commitment to Real Time interactive processing. A Dublin or Cork location is available for these positions.

CW30/3 DUBLIN/MAYFAIR

Recruitment Sales

CCC is a highly respected and successful recruitment company with offices in London, Dublin and Amsterdam. We wish to appoint a highly motivated sales consultant with a proven sales record, preferably within the Data Processing industry, with ability to secure and implement recruitment assignments.

This is an opportunity to succeed in a buoyant market where personable and determined men or women can earn a very high standard of living.

Remuneration is based on a negotiable salary, generous commission scheme and profit sharing. For a confidential discussion, please telephone or write to Stella Mitchell, Kingston.

CW30/7 KINGSTON

Design a New Operating System

West London

Our client requires a System Software Designer to work in a small experienced team of highly motivated people. They will be designing a new operating system for an existing mini and as yet an unannounced mainframe. Previous experience of low level coding down to the hardware is essential and some knowledge of communications is preferred.

For a confidential discussion contact Stella Mitchell at the Kingston office.

CW30/8 KINGSTON

Programmers Systems Analysts

There is a time when you can vastly improve the spectrum of your knowledge but use your abilities to take financial control of your earning power. A wholly owned subsidiary, of a large and most respected public company involved in a vast range of commercial software projects, need to recruit a number of talented programmers and analysts.

Business systems based on COBOL and RPG 11 are being developed to a large degree at their London headquarters. In addition however, a definite commitment has been made to the setting up of a branch office in Holland due to their awareness of the necessity to expand into Europe.

Career development is considered a high priority of our client who would be happy to discuss opportunities, structure and philosophy of their highly reputable company with you.

CW30/5 MAYFAIR

Systems Software Programmer

c.£5700

Here is the opportunity of a lifetime to return back to your native homeland and work in one of the more pleasant areas of Scotland and be within commuting distance of Glasgow. This would also suit any computer professional who is ambitious and would appreciate getting in one the ground floor of a new department and enhance his or her career with a sophisticated computer training with a well established solid organisation who are a well known name.

The candidate we are seeking should be familiar with OS/VS and OS/VSI and have ideally a strong ASSEMBLER and COBOL background. A knowledge of IMS/DLI would be of added interest but not essential as training will be given in this area.

The configuration is a large scale IBM 370 using multiple user files with on-line interactive and batch terminals with both DB/DC and RJE technology.

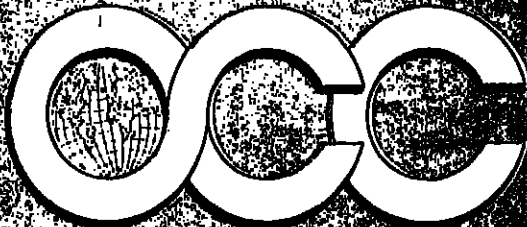
There are additional benefits including relocation assistance and free life assurance plus four weeks holiday.

CW30/2 KINGSTON

Kingston: 44 Wood Street, Kingston upon Thames, Surrey.
Telephone 01-549 3212 (24hrs) Telex 27950
London: 5-6 Yarmouth Place, Brick Street, London W1Y 7DW.
Telephone 01-499 9214 Telex 27950
Dublin: Canbarra House, 24 Lower Leeson Street, Dublin 2.
Telephone 762170 762168-765692 Telex 30742
Amsterdam: Rijnvlietsteet, Amsterdam 1010.
Telephone 461844 Telex 11336

Computing
Services
Association

Applying for a job



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in UK and international
computer appointments

OCC computer personnel limited

● Tehran

IMS Specialist \$30,000-\$35,000

Initial 1 year contract.

Our client is an Iranian Consultancy who is heavily involved in the development of a major database project based on twin 370/158's under OS/VS2. The initial phase of the system is currently at the implementation stage and an IMS software specialist is required to oversee the IMS software implementation in a troubleshooting, advisory and training capacity. The person appointed will be the prime source of database software expertise and must therefore be able to demonstrate an in-depth knowledge and experience in IMS/VS (design and maintenance of DB and DC systems) and extensive experience in OS. A knowledge of PL1 and TSO would be extremely useful. There is also a vacancy on the team for a competent OS systems programmer with a more basic knowledge of IMS.

The contract will initially be for one year with a further renewal option. Remuneration package consists of an attractive salary, free work transportation, medical sickness plan and contribution to school fees where applicable. Ideal start date would be beginning of September, but could be open to negotiation.

Client interviews will be held in London in mid-August, so interested candidates are requested to apply as soon as possible.

Ref. 444/CW/Sharon Matthews.

● UK Amsterdam

Programmers c£5,000

Mini based real time Air Cargo System.

A major international Consultancy organisation is currently embarking on the development of a range of mini computer based systems for the air cargo industry. The systems will initially be developed in the UK with the intention of transferring the whole team permanently to Amsterdam towards the end of 1978. A number of programmers are required to work as part of the team in developing and testing applications software from the functional specification stage. The systems are being developed on a dedicated mini computer with 128K core and 40 Mbyte disc storage, supporting up to 60 video terminals and utilising advanced database techniques.

Candidates for these positions should have a minimum of 3 years' programming experience including real time mini applications, preferably using both high and low level languages. Salaries quoted are for initial UK positions but could be open to negotiation for candidates with exceptionally relevant experience. On transfer to Holland salaries will be renegotiated in line with the Dutch payroll. Full relocation expenses will be paid.

Client interviews will be held in London week commencing 8th August so for further information and application form, please call as soon as possible.

Ref. 315D/CW/Sharon Matthews.

To apply for any of the above positions or for further information, please telephone or write to the Consultant concerned on 01-242 9356. If it would be more convenient to telephone in the evening, the telephone numbers are:
Neville John - Farnborough (Kent), (06) 52017. Roger Allington - Barchingham (04427) 2299.
Renée Nute - 01-874 6372 Sharon Matthews - Billerica (02774) 22357.

Members of
Computing
Services
Association

● N. Kent Coast

Senior Programmer Analyst c£4,500

On-line order entry system being specified for B1726 COBOL on ANY hardware required.

This vacancy offers excellent prospects for career development to a programmer or analyst programmer with at least 2 years' COBOL experience on ANY modern hardware. He or she will join the development team of a substantial industrial organisation with plants at different locations in North Kent, and will work with the small team currently specifying the new on-line sales order entry system for their disc and tape B1726. The system will utilise VDU's and printing terminals and is due for implementation early in 1978. There is a full systems development programme for the future, which will ensure continuing job interest and progression once the initial project has been implemented. Benefits include four weeks' holiday, good sports and social facilities (football, badminton, sailing, etc) and removal expenses will be paid in appropriate cases.

Ref. 718/CW. Neville John.

● Minis

Programmers £3,500-£5,500

A number of vacancies are available in LONDON, the SOUTH EAST and MANCHESTER for Programmers and Analysts/Programmers with at least 1 to 2 years' experience on MINIS, VRCs, SMALL MAINFRAMES. Applicants should have been programming in ASSEMBLER, RPG or COBOL. They may have a commercial or a software background. The positions are with Computer Manufacturers or a Software House. The work offered can be creative, in the case of in-house projects for new range or existing machines, or customer oriented in a support function. The salaries offered vary according to experience and location and may include a car allowance where applicable.

Ref. 888/CW/Renée Nute.

● London, Birmingham, Reading, Edinburgh

1900 Programmers £3,500-£5,500

We have a number of attractive vacancies for good 1900 experienced programmers in LONDON, READING, BIRMINGHAM, SCOTLAND and OVERSEAS.

We would like to hear from:
SENIOR PROGRAMMERS and PROGRAMMERS with a minimum of 2 years' experience and a very good knowledge of COBOL/GEORGE 3/IMS. Vacancies in London, Birmingham, Reading, Edinburgh and overseas.

APPLICATION PROGRAMMERS with at least 2 years' commercial experience, educated to degree standard for advanced project (Reading) PROGRAMMERS and ANALYST/PROGRAMMERS wishing to move towards systems work with the ability to work in a customer environment in a support role. (London, Birmingham, Scotland).

Ref. 888/CW/Renée Nute.

DEPUTY D.P.M.
Survey
Preferably a Science Graduate 25/35 with good IBM background (DOS, DOS/VS) + in depth TP together with BAL and commercial applications. Suit ex project leader.

PROJECT MANAGER London NW
Able to act as Consultant to clients, leading 2/3 teams with a good commercial/analyst/software background. Real time + mini/mainframe experience.

SENIOR S/ANALYST W. Surrey
Direct responsibility for team of up to 5 people. Burroughs 3700 with COBOL but other mainframe accepted. New section being organised, lots of scope with new projects.

SENIOR OPERATOR London NW
At least three years experience on IBM 370 with OS for this 4 shift situation. Good company perks.

SOFTWARE PROGRAMMER W. Surrey
New position with this large company which is restructuring its DP section. Burroughs 3700 with COBOL.

Many other unadvertised positions. Salaries generally negotiable. Ring now for immediate action.

COMPUTECH Systems & Personnel Est. 1961
168, Finchley Road, London, NW3 8HP

THE BRITISH LIBRARY Computer Systems

The following London-based posts are available:

Head of Internal Customer Services

To control a team implementing the Library's Computer Systems for internal users. Work includes analysing user needs, preparing implementation plans, and costing user requirements. Appointment as Senior Research Assistant. Candidates (aged at least 28) must have at least 2 years' library experience, and should normally have a degree with 1st or 2nd class honours (or an equivalent qualification) and some experience of library automation.

Library System Implementor

To join a team analysing the needs of each new user of the Library's Computer-based Cataloguing System and implementing an appropriate system, involves keeping in contact with users, and compiling and maintaining statistics on system usage. Appointment as Research Assistant Grade 1 or 2 according to age, qualifications and experience.

Candidates should normally have a degree, a library qualification, and at least 1 year's library experience.

Salary: SRA £5170-£6765; RA 1 £4230-£5440; RA 2 £3070-£4610. Starting salary may be above minimum of appropriate range. Non-contributory pension scheme.

For full details and an application form (to be returned by 30 August 1977) write to Civil Service Commission, Alcon Link, Basingstoke, Hants RG21 1JB, or telephone Basingstoke (0256) 68551 (answering service operates outside office hours). Please quote G/95/72.



MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

SALES LONDON

T.E. to £10K + Car

The company is a prosperous mini computer manufacturer currently reaping the rewards of a successful number of years in the industry and now expanding their sales force. To be considered for this post, applicants must have sold mini or mainframe systems to the commercial market. The prospects are a steady growth with excellent financial rewards. In addition to this are all the benefits of working for a major company including first-class technical support.

Contact Faye Ogilvie

Software PROG £4-4 1/2 K BERKS

Microprocessor technology is revolutionising the computer market and is the basis of our client's outstanding peripheral range.

To help support their applications and field service groups, they require an experienced ASSEMBLER Programmer to develop special diagnostics and utilities to run on their disc based mini/microprocessors. This is a rare opportunity for the person who enjoys working at machine level on entirely new projects and should offer great variety and scope.

Contact Pam Quinlan

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

SALES LONDON

T.E. to £13K + Car

Without doubt communications is one of the most expanding areas of the computer field and our client is seeking additional sales people to take full advantage of this lucrative area. They are a professional, highly regarded manufacturing company and demand a high standard of technical and sales expertise. An engineering background would be preferable but not essential.

Contact Faye Ogilvie

ANAL/PROG £4 1/2 K SOUTH LONDON

A management that cares for its staff and location, that provides excellent commuting facilities, are important factors for the person hoping to find an interesting job in a company that offers them a secure future.

Our client, a large travel agency, are developing an on-line integrated management and accounting information system for their branches. They require a mature RPG II Programmer with IBM SYSTEM 3 experience to assist them in additional new developments. As well as the usual benefits, the company offers valuable travel concessions.

Contact Pam Quinlan

MANAGEMENT & EXECUTIVE SELECTION

HUGIN CASH REGISTERS LTD.

KEY ACCOUNT MANAGER/ MANAGERESS

Hugin requires an experienced Cash Register Representative to sell to key accounts in the Birmingham area. We offer a good basic salary, car, expenses and commission. For further information write or telephone K. Faggetter, HUGIN CASH REGISTERS LTD., 18-30 Clorkenwell Road, London, EC1. 01-261 4161.

National Coal Board Mining Research and Development Establishment

The Mining Research and Development Establishment is the National Coal Board's centre for research, development and testing in all fields of engineering related to Coal Mining. Applications are invited for the following post in the Computer Systems Branch.

DATA PROCESSING MANAGER

The duties will include management of the team providing the Data Processing Service for the technical staff of the Establishment; provision of programming and systems advice to users of the service; planning and development of new systems including data conversion systems, local processing facilities and intelligent terminal systems; and liaison with a Computer Bureau. At present both remote batch and interactive terminals operate into remote IBM 360 and 370 computers operated by a bureau.

Candidates should have a degree in a technical subject and have experience in the use and operation of data processing systems. They should possess a sound knowledge of high level languages including FORTRAN, and an understanding of Job Control Languages. Some knowledge of minicomputer systems will also be an advantage.

The starting salary will be in the range £4500 to £5000 according to qualifications and experience. Excellent benefits include nearly six weeks' annual holiday.

Application forms may be obtained from the Personnel Administration Branch within the next seven days.

NCB
National Coal Board
Mining Research and Development Establishment
Ashley Road, Birmingham B4 7AA
Business hours 01-619 0000

Management Opportunity for RSTS/RSX Expert

We are retained to recruit a fully qualified software expert who is ready to move into a management role. The position is based in the Midlands with a mini manufacturer. You should have:

- * Deep knowledge of RSTS, RSX and BASIC PLUS.
- * Ability to work with clients and to support the marketing team.
- * Communications experience is highly desirable.
- * Ability to motivate up to 10 staff

You will obtain:

- * Negotiable salary, in the region of £8,000.
- * Car or car allowance.
- * Opportunity to join small management team.
- * Excellent potential due to market position of the company.
- * Assistance with relocation.

For a confidential discussion, please apply to Pat Convey, quoting REF. CW12.

Basic plus Analysts and Programmers c. £5,000

Our clients also require analysts and programming staff for commercial developments. You should have:

- * Two years' commercial BASIC PLUS experience on any hardware.
 - * Wish to help develop advanced application software.
 - * Willing to work as part of team.
- The benefits include:
- * Potential for career development within advanced systems.
 - * Experience of a wide variety of commercial applications.
 - * Opportunity of direct involvement with customers.
 - * Good conditions of employment.

For a confidential discussion, please apply to Pat Convey, quoting REF. CW12.

COMPUTER PERSONNEL CONSULTANTS, 021-632 6848 (24-hr. service)
The Rotunda, New Street, Birmingham B2 4PA

We offer career counselling for computer professionals — Contact us for a confidential discussion

CPC
COMPUTER PERSONNEL CONSULTANTS

A Prominent Group Technical Support Engineers

MINI AND MICRO REAL TIME SYSTEMS

Hertfordshire **Salary negotiable £4,500 + Co. Car**

A well renowned international group is expanding in the field of banking terminals and financial security systems and need a number of experienced engineers to join their Hertfordshire location.

Technical Support Engineers are required to assist with new installations and with technical trouble shooting. They will also support demonstration equipment both in house and at exhibitions and sales presentations.

The applicants must possess an HNC or C & G in electronics and have spent at least 3 years in a mini/micro environment. Applicants should be able to interpret and write programmes in basic machine language and ASSEMBLER. A knowledge of formatting and directives is also desirable, together with extensive digital hardware experience.

The position supports company technical personnel in the U.K. and abroad.

Please reply to our CROYDON office quoting ref: CW60-75.
01-686 9693 (24 HOUR ANSWERPHONE) | 061 236 2419 FAULKNER HOUSE,
19, PARK STREET, CROYDON, CR9 1TN | FAULKNER STREET, MANCHESTER, M1 4YD

COMPUTER AND
PERSONNEL
CONSULTANTS

CAPP ASSOCIATES

LONDON AND MANCHESTER

Computing
Services
Association

MYRIAD OPERATIONS

Computer Personnel Consultants

SENIOR OPERATORS SHIFT LEADERS

Large 370 series **£4000+**

The data processing operations of a major commercial organisation in CENTRAL LONDON, are currently undergoing a review, pending expansion. If you can offer a minimum of two years' DOS/VS or OS experience, you may be invited to participate in this exciting programme.

At present you are probably a senior operator capable of demonstrating a sound appreciation of the principles involved in the organisation of a computer room. You should also be able to display considerable supervisory ability.

You will be encouraged to become involved with all aspects related to both your shift and the operations department as a whole.

Prospects for career advancement are excellent, and as you would expect the starting salary is enhanced by a range of first rate fringe benefits.

Please telephone for a confidential discussion or write to:
 101 East Street, London EC4A 3BS
 01-353 5000

Distributed Computer Control

BRISTOL: UP TO £5500

Applications are invited for an appointment as a Research Officer in the Control Technology Section of the Scientific Services Department. The Section is actively engaged in the development of distributed computer control systems for modern generating stations.

The successful applicant will have a good honours degree in engineering or applied science and be in his/her early twenties. At least two years' industrial experience together with experience in assembler level programming is desirable. The successful applicant will also be expected to make a major contribution to the software aspects of a boiler control system currently being installed at Pembroke Power Station, West Wales.

The post will be based at the new laboratories at Bedminster Down, Bristol, but will be located at Portishead until early 1987. Visits to power stations throughout the Region will be an essential part of the work.

Applications on Form AF/1, obtainable by phoning Bristol 32251 Ext. 18, or by writing to the Personnel Manager should be completed and returned to him quoting Vacancy Notice Number 265/77 by not later than 19th August, 1977.

EXPERIENCED COMPUTER OPERATOR

UDT, Britain's leading independent finance company has vacancies for two computer operators in the computer installation at Cockfosters. This installation consists of an IBM 370/145 to be changed later this year to an IBM 370/148 operating under OS/VS1 and services a network of 50 terminals supported by CICS. A three shift system covering 24 hours per day, five days a week, is operated.

The UDT computer installation is situated in pleasant surroundings on the edge of the green belt.

Candidates should be at least 21 years of age, with eighteen months IBM OS/VS1 or MFT experience and have a good educational background ('O' levels are necessary, 'A' levels will be an advantage).

To the right applicant we offer:

- * a starting salary of £3,300 per annum inclusive of shift allowance.
- * opportunities for occasional overtime, at week-ends
- * seventeen days holiday
- * subsidised staff restaurant.
- * comprehensive sickness benefit scheme.
- * non-contributory pension and life assurance scheme, after a qualifying period of service, staff loans.

For an application form, please write or telephone The Personnel Manager, United Dominions Trust Ltd., Holbrook House, Cockfosters Road, Cockfosters, Barnet, Herts., EN4 0DY. Telephone Number 01-449 5533, extension 284.

Programming Opportunities With GOODYEAR

We are the world's largest manufacturer of motor vehicles and have major plant installations at Wolverhampton, Luton, and Slough. We have a countrywide network of Dealerships and a fleet of vehicles for the An IBM installation at Wolverhampton processing data for the range of applications with particular emphasis on the control of a system 370/145 is already catering for the increasing demand for control and for online and communications based systems.

We are now looking for Programmers with F1, F2 and F3 experience who have the ability to contribute to the development of both hardware and software in important phases in the development of both hardware and software real time systems.

These appointments offer real career opportunities, a good salary and a comprehensive range of large company fringe benefits, including life insurance and contributory pension scheme. Substantial assistance with relocation expenses will be paid where appropriate.

Applications should be made in writing to The Staff and Factory Recruitment Officer, The Goodyear Tyre & Rubber Co. (GB) Ltd., Buthbury, Wolverhampton.

Central Electricity Generating Board

South Western Region
Oakfield Grove, Clifton,
Bristol BS8 2AS

SENIOR APPOINTMENTS

CONSULTANTS—Systems & Programming Analysts BANKING SPECIALISTS — CITY

c £8,000 + , plus Profit Share plus excellent fringe benefits


Our clients are one of Europe's largest and fastest growing software houses. Their record over the past few years has been exceptional and the respect the Company has built up within the finance world is well known.

Candidates, who could well be currently working within a finance house or the service industry, will need to demonstrate an in-depth knowledge of the following:—

- The "SWIFT" banking network
- Foreign Exchange
- Hardware Evaluation
- Systems Design

A knowledge of SID's as well as POP II's would be an advantage although not essential.

For a confidential discussion please telephone Dean Williams immediately, quoting Ref. No. CW-141.



**Insight Marketing & Personnel
Consultants Ltd.**
 72-75 Marylebone High Street
 London W1M 4AJ
 Telephone: 01-488 5644

THORBAR

RECRUITMENT AND CONSULTANCY SERVICES

Greenock House 19 Cuckfield Road Hurstpierpoint Sussex
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SPECIALISTS IN DP AND EXECUTIVE RECRUITMENT

JUNIOR PROGRAMMERS SURREY

**SALARY TO £3,500 PLUS ATTRACTIVE FRINGE
BENEFITS. BONUS. SUBSIDISED MORTGAGE.
FREE LUNCHEON FACILITIES, ETC.**

Our clients have invested extensively in IBM 370 and are a recognised leader in advanced computer technology. Its aim is to develop the most modern computing and programming technique including structured programming and top down design. As an organisation they are efficient and highly profitable and insist on the highest standards from their employees. They are wishing to expand the department and need young and energetic people to join their existing team and would look for the candidates to have the following experience:

1. From six to 18 months' experience in programming. (Any computer.)
2. An ability to communicate is vital.
3. An acceptable personality that would fit into a team environment.
4. A good academic level of education would be expected.

They offer a first-class career opportunity which could develop into systems or software whichever way you are best suited.

**WE HOPE FROM YOUR TELEPHONE CALL OR LETTER TO HAVE THE OPPORTUNITY TO DISCUSS THE NEXT IMPORTANT STEP
IN YOUR CAREER.**

A MEMBER OF THE BURTON GROUP

We have installed a brand new Univac 90/60 at our London Data Centre in Hammersmith. It will be supporting a major on-line system and we need to supplement our existing operations staff to cope with this extra workload. Candidates should have the ability to maximise throughput in a busy multiprocessing environment and be able to communicate with staff at all levels.

SHIFT LEADER **to £4,750 inc.**
 As shift leader you will have had a good Univac 9000/series 90 or IBM 360/370 background. You must be at least S/L or Snr. Op level at present and be used to running a shift and carrying all the accompanying responsibility.

SNR. OPERATOR **to £3,600 inc.**
 You must have at least 2 yrs Univac or IBM experience and be adaptable enough to learn all about our new equipment quickly. You will be expected to deputise for the S/L in his/her absence.

We operate a 3 shift system. Monday to Friday and you will receive all the benefits associated with a large group, including discounts and L.V.s.

Contact **MARILYN DAVIDSON** on 01-836 6775

Computer Personnel International

110 St. Martin's Lane, London, WC2N 4BH

COBOL COMPUTER PROGRAMMING INSTRUCTOR

Over £5,000 p.a. + +

We are the largest commercial training organisation in the United Kingdom and we have vacancies for the most experienced, including the Ministry of Defence. Previous training experience an advantage.

Salary: over £4,500 p.a. + +
 9.00 a.m. to 5.30 p.m. Mon-Fri
 If you have a chance to teach, please phone me now, Steve Gosch, 01-497 1841

ELECTRONICS TECHNICIAN

We are a Computer Communications Centre for construction and maintenance of wide range of communications equipment: HNC/DNC and several years' experience in logic design, preferably small computers. Training given on computer communications techniques. Salary scale £2,800-£3,300 p.a. Ref 880 C/185

Apply Assistant Secretary, Personnel Office, University of Birmingham, P.O. Box 363, Birmingham B15 2TT.

AMBITIOUS TO SUCCEED

£6,000-£15,000

We are a W.I. agency that needs a dynamic individual to run and set up a new computer division handling permanent staff. We're young, progressive, with loads of ideas and brains to carry them through. Total independence to do it your way as long as you can really do exceptionally well.

Phone 01-437 4060
 Sheila Walsh, London Appointments

ICL 1900/2900 Analysts and Programmers

**£5-£8,000
+ Low-cost mortgage**

London

Our clients are a major financial organisation with a solid reputation in the professional business world. They are currently installing ICL New Range equipment to augment their existing configurations.

As a result of this expansion and an ever increasing workload, they are now seeking to recruit Analysts and Programmers with a minimum of three years experience in a commercial environment. Ideally, candidates will possess a sound knowledge of ICL 1900/2900 applications; experience of Database or on-line systems would be a considerable advantage.

Successful candidates will be able to display the degree of presentation and professionalism required when liaising with financial user departments at a senior level.

In addition to excellent career prospects and involvement in new areas of applications and equipment, the company offers an impressive range of benefits including mortgage assistance schemes, low cost insurance etc.

Ref: MGH 652

**Lloyd Chapman
Associates**

23-25 Maddox Street London W1R 9LE 01-488 7761

Manager-Software Engineering

For a new project team exploiting Europe's foremost
Communication Equipment.
c. £16,000

Based Europe

Our Client is a major British and International force in the field of Electronic Telecommunication. Traditionally market leaders, by sales and innovation, they are now putting together a multi-disciplined team to develop and exploit internationally an advanced range of processor controlled exchange equipment. The team will work initially between London and Western Europe, but sales will be directed throughout the world.

This is a key post involving the inspiration, direction and management of a comprehensive team of engineers designing and supplying software systems applied to processor controlled telephone exchange equipment. The work will involve the use of structured programming and specialised high level language together with simulation to ensure the necessary standard of performance. It will involve liaison with all other functions within the Company at senior level and with major international customers.

Candidates will have a proven track record of directing and developing multi-disciplined teams and a record of getting quality results on time within pre-set financial parameters. Experience on real-time systems with on-line diagnostics will be particularly relevant to this position.

The compensation package is negotiable and reflects ability, experience and location. It will be competitive with any other comparable European based posts.

Applicants, men or women, should apply in strict confidence to P.M. Small, who is advising the Company, quoting Ref. 544/CW and stating experience, age, qualifications and present salary to:

CB-Linnell Limited
 8 Oxford Street, Nottingham
 MANAGEMENT SELECTION CONSULTANTS
 NOTTINGHAM LONDON

A Prominent Group Hardware Design Engineers

MINI AND MICRO REAL TIME SYSTEMS

Hertfordshire **Salary negotiable CE5,000**

A well renowned international group is expanding fast in the field of banking terminals and financial security systems and need a number of experienced engineers to join their Hertfordshire location.

Electronic hardware design engineers are invited to be part of a team working on design of communications and peripheral interfaces using analogue and digital techniques.

3-5 years' experience in TTL and MOS design is essential together with a general knowledge of computer hardware.

Experience of micro processor hardware and software is also desirable although relevant training will be given in this field.

Please reply to our CROYDON office quoting reference CW51-75.

01-686 9693 (24 HOUR ANSWERPHONE) | 061 236 2419 FAULKNER HOUSE,
19, PARK STREET, CROYDON, CR9 1TN | FAULKNER STREET, MANCHESTER, M1 4YD

COMPUTER AND PERSONNEL CONSULTANTS **CAPP ASSOCIATES** Computing Services Association
LONDON AND MANCHESTER

COMMON SERVICES DIVISION
SCOTTISH HEALTH SERVICE
INFORMATION SERVICES DIVISION

1 INTERMEDIATE PROGRAMMER
(£3534-£4344 plus supplement)

The Information Services Division of the Common Services Agency has a vacancy for a programmer to work on a variety of financial, administrative and medical applications on its ICL 2803 computer system.

Applicants must have a good knowledge of ICL Cobol and one other language e.g. Fortran, RPGII, Plan or Fileaid and at least three to four years' practical experience on financial systems including Payroll.

Knowledge and experience of the health service will be an advantage.

Application forms and further information are available from, and should be returned to, Appointments Section, Common Services Agency, Trinity Park House, South Trinity Road, Edinburgh EH8 3SE, no later than 19th August, 1977.

CAPITAL APPTS.
PETROCHEMICAL
project development N.W. London. Technical programmers required with **FORTHAN** experience. Salary £3,500-£4,000.
SA. Percy St. 037 5551 day/445 0468 eve.

A MULTI NATIONAL COMPANY ON THE SOUTH COAST HAS A NUMBER OF MAJOR SYSTEMS TO BE DEVELOPED AND IMPLEMENTED IN THE UK AND SEVERAL COUNTRIES THROUGHOUT THE WORLD AND THEREFORE REQUIRES:

TWO ANALYSTS

SOUTH COAST

Candidates should have played a major role in developing at least one large disk based system and should have the ability to communicate well at all levels. Both positions present excellent career opportunities and the chance to move in to other areas of data processing.

MORTGAGE SUBSIDY

GENEROUS RELOCATION PACKAGE

POSSIBLE INTERNATIONAL TRAVEL

STAFF RESTAURANT

NON-CONTRIBUTORY PENSION MEDICAL AND LIFE ASSURANCE

The salaries for these positions are negotiable depending on experience.

For more information and to arrange an informal interview contact **STUART WINFIELD**

RECRUITMENT RESOURCES

2 Great Marlborough Street
London W1V 1DE
Telephone 01-439 9817

Analysts and Programmers for Management Services in the City.

Whitbread & Company Limited, one of Britain's largest brewing groups, is currently engaged in an expansion programme with the commitment to develop and install advanced DP systems utilising Distributed Intelligence and nationwide Terminal networks. This will be based on a complex of Honeywell 725's and level 64's strategically situated throughout the UK. All development work is centralised through our Management Services Department located at Chiswell Street, London E.C.1.

Due to the increasing demand for the Department's services within the Group we now need to strengthen and expand our project teams over the next few months by the appointment of a number of Analysts and Programmers with various backgrounds and levels of experience. The department operates a career structure at all levels which provides opportunities for advancement through programming to analysis.

Systems Analysts £5000-£7000

Candidates should have sound academic qualifications and at least 2 years' experience in Systems Analysis, preferably in a commercial environment. The more Senior positions will require a minimum of 4 years' relevant experience. The applications are wide ranging from a mini computer order entry system to standard commercial applications covering the finance, production, distribution and marketing areas of the Company. Knowledge of Honeywell equipment is desirable but not essential. There is the opportunity to join the department as an Analyst/Programmer or an alternative to pure systems analysis. Ref: HQ36

Programmers £3500-£6000

Programmers with upwards of 1 years' COBOL experience are required to join an established programming team. The more senior positions will involve supervision of other programmers working in project teams. Honeywell experience would be a valuable asset to any candidate, although not essential. The main language is COBOL, however there are applications where a working knowledge of Easycode, RPG, Fortran and Fileaid would be a distinct advantage. Opportunities exist for the right people to progress through our Analyst/Programmer function into Systems Analysis or for the professional programmers who do not wish to move into analysis there are Team Leader Vacancies. Ref: HQ35

Actual starting salaries will depend on individual qualifications and experience, and will be supported by a substantial range of fringe benefits. Please write to or phone for an application form: J.F. Jarvis, Selection Manager Whitbread & Co. Ltd., Chiswell Street, London EC1Y 4SD. Tel: 01-606 4455 Ext. 251, quoting the appropriate reference.

WHITBREAD

Experienced Data Processing Staff

Salary range approximately £2,028-£5,472 per annum

The Authority at present operates duplex 512K 370/135s under DOS/VS. There is an extensive teleprocessing network under SHADOW which is expanding to over 100 remote and local VDUs connected via a dozen multi-dropped lines to 3704 communication controllers. The computers are scheduled for upgrading to IBM 370/148s next year.

It is planned to convert to OS/VS1 while retaining a limited DOS and CMS use under VM. Applications from programmers with OS systems experience would be welcome as would those from IBM DOS operators who are prepared to work shifts.

Recruitment could be at any level within the above salary range for Data Processing Officers depending on age, ability, training and experience. Further training would be available according to the needs and aptitudes of the individuals recruited.

Opportunities exist for transfer to programming and systems analysis work for operators with the necessary aptitudes.

20 days' holiday (minimum)
Five day week, hours 8.45 a.m. to 4.45 p.m.
Superannuation scheme - interchange arrangements.
Subsidised Staff restaurant.

Applications, quoting reference CW and giving full particulars of age, educational qualifications and previous experience should be sent not later than 15th August, to:

Laurence O. Wild, C.Eng., F.I.C.E., F.I.Mech.E., F.I.W.E.S., Divisional Manager, Room 680, Thames Water Authority, Metropolitan Water Division, 173 Rosebery Avenue, London, E.C.1.

Thames Water

Metropolitan Water Division

Rolls-Royce Limited Aero Division Computer Operations

Rolls-Royce are planning for the 1980's when we intend to win an even larger share of the World's demand for advanced aero engines.

Data processing has been an essential service within this Company for more than twenty years and we are coming to the end of an equipment re-configuration cycle which is capable of supporting the increased requirements of all areas of our business.

In Derby this re-configuration includes 3 x IBM 370-168 units and IBM 3850 (mass storage) running under control of MVS/JES 3 operating environment. Programmers are now needed to complete the picture.

Applications are invited from candidates who have at least one year's experience of working on a project and are capable of producing good quality work to schedule. The main programming language is PL/I and where necessary we will offer training in that language to successful candidates.

Salary will be in accordance with age, qualification and experience.

Systems Analysts are also required in Derby, to assist management by analysing business situations and problems, to plan and conduct the design of solutions which may involve the application of computer technology to implement the agreed solutions.

Candidates for the senior analyst posts should preferably have a degree with relevant background experience and proven ability, those for analyst posts have a degree or other suitable qualification and for trainee analysts the minimum qualification is three GCE 'A' levels.

Salary will be in accordance with age, qualification and experience.

The Bristol Group requires Application Programmers to work with the systems design teams in the preparation of detailed computer specifications and to code, test, implement and maintain the systems.

Candidates should be aged up to 35 years with good educational background and at least two years programming experience preferably COBOL, but candidates with competence in PL/I or other languages will be considered.

A sound knowledge of JCL is desirable and IBM experience would be an additional major qualification. Salary will be paid in accordance with age, qualifications and relevant experience.

In each of the above we shall be pleased to discuss relocation expenses with candidates male or female who are invited for interview.

The Company operates a comprehensive Staff Pension Scheme.

Enquiries should be addressed to:-

Mr J A J Clarke, Senior Personnel Officer
Rolls-Royce Limited
PO Box 31 Derby DE2 6BT
Telephone Derby 42424 Extension 109
or
Mrs J. King, Staff Employment Office
Rolls-Royce Limited
Pawley, Bristol
Telephone Bristol 893871 Extension 231

DATEC

EDP CAREER OPPORTUNITIES

£4,500-£7,500

DATEC is AUSTRALIA's largest and oldest independent software house specialising in customised computer applications. In 11 years of operation we have grown to some 100 professional staff in Sydney, Melbourne, Brisbane, Canberra, Perth and Adelaide.

It is our intention to operate a Contract Systems and Programming Division in the Greater London Area. Positions will be available over the next few months for programmers, analyst programmers, (range £4,500 - £8,000), technical specialists, project leaders and consultants (range £5,000 - £7,500). These positions could also be made available to people wishing to emigrate to Australia within a 6-12 month period of joining Datec in London.

Datec requires applicants to have a high level of expertise in one or more of the following:-

- Applications programming in Cobol, PL/I, RPGII, etc.
- Project Management
- Systems analysis and design
- Commercial mini systems
- Machine house systems support
- EDP consulting
- Database systems - DL/I, Total, etc.
- Communications/on-line systems - CICS, TIPS, DRIVER, etc.

CAREER OPPORTUNITIES: In London, the company will operate in all areas of commercial applications - consulting, systems design and programming, on mainframes as well as commercial minis, and EDP training.

Our founder and Managing Director, Mr. Harry Douglas, will be pleased to receive written applications from prospective candidates, addressed to him at the London Hilton Hotel, Park Lane, London. Applications should be sent to arrive by 10th August, quoting ref. CW-LB-77.

DATEC PTY. LTD.
220 GEORGE STREET, SYDNEY, N.S.W. 2000
AUSTRALIA

HALFORDS

SENIOR COMPUTER OPERATOR

Interested in working with an enthusiastic crew of computer operators?

This might be your chance if you can supervise, operate a computer, assemble jobs and control a file laboratory.

We run an ICL 1903A with a wide range of peripherals and use George II exclusively.

Our working environment is pleasant, our job types are varied and interesting. You should, however, be prepared to work shifts.

There are career development opportunities in Programming for those who can show a potential for such work.

Please write with details of your business experience to date with education records, to:

K. M. Mackay
Halfords Limited
Edmund Street Drive
Washford West
Redditch
Worcs.
B98 0DE

SOUTH WESTERN INDUSTRIAL RESEARCH LIMITED
(University of Bath)

PROGRAMMER

Applicants are invited from experienced graduate programmes to join SWIRL, a consultancy Company based at the University of Bath.

The Programme will work in conjunction with staff of the University Computer Unit on the development of computer applications for research and development projects undertaken by SWIRL.

Salary will be within the range £2904 to £4811 per annum.

Application forms available from the Personnel Officer, University of Bath, Claverton Down, Bath, quoting reference number 77/84. Closing date will be Friday, 19th August, 1977.

DATA PROCESSING CONTROLLER +

The Data Processing Controller with some knowledge of systems and programmes is required by the Institute of Personnel Management to head its Membership records section. This is a junior executive post with a commencing salary up to £3,750. LV's 45p per day and 4 weeks' holiday.

Applications in writing to J. T. ELLISON
General Administration
Manager
Institute of Personnel Management
Central House
Upper Woburn Place
London WC1

RECRUITMENT RESOURCES

2 Great Marlborough Street
London W1V 1DE
Telephone 01-439 9817

CAPITAL APPTS.
FORTHAN
Programmers urgently required for industrial and scientific development.
£3,500-£5,000
ALL AREAS
Phone for free list of vacancies
037 5551 day/445 0468 eve.

IBM DOS OPS
12 months' experience
Essex, c. £3,500 p.a.
Phone 01-439 6481
(24 hours)
EFFECTIA GRAVIS
Personnel Consultants

CONTRACT - NORWICH
Assembler DOS/CICS/VS
(3 months initially)
Phone (0603) 867233
any time up to 9 p.m.

1900 COMPUTER ENGINEERS

As a result of continued expansion Mills Associates Limited, National Computer Service Organisation, require first-class Engineers in the following areas:

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TYNE AND WEAR **SCOTLAND**

Candidates must have experience of working on:

1902A - 1802T Range
1901
1900 Peripherals
1900 Communication Systems

An attractive salary is offered commensurate with experience together with a profit-sharing scheme, stand-by and call-out payments. London allowance paid. 4 weeks' annual holiday. Company car.

Applications, giving career details to date, in strict confidence to:-

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Mills Associates Ltd.
Wonsatow Road
Monmouth
NP5 4YE
Tel: Monmouth 2131

Branches at: Monmouth, Bristol, Birmingham, Chertsey, Cardiff, Edinburgh, Manchester, Nottingham, Swansea.

Mills Associates Ltd.

MERSEYSIDE COUNTY COUNCIL JOINT COMPUTER UNIT PROGRAMMER

(£1,215 - £4,095 p.a. + supplements)

The successful applicant will have at least 18 months COBOL experience on any machine and will be part of a programming team, having the opportunity to specialise in systems software and systems analysis.

A 192K 1904S under GEORGE 3 is presently in use. Batch and on-line applications are being developed, varying from highway engineering to stock control. Terminals are used for all development work.

Salary negotiable in accordance with experience.

Application forms from the County Treasury, Merseyside County Council, P.O. Box 95, Metropolitan House, Old Hall St., Liverpool L89 3EL. Closing date: 22nd August, 1977.

Systems Analyst

A key role with career prospects at Ford Daventry.

Ford Daventry is the Distribution Centre for Parts and Accessories for all Ford Vehicles built in the UK.

It is a large-scale, highly sophisticated operation utilising the most up to date computer systems to ensure its efficient running and maintain a high output.

To Systems Analysts, particularly graduates, with at least two years programming experience, including ideally ANS COBOL for IBM 370, this fast moving environment offers considerable challenge, scope and career opportunity.

Working on a variety of assignments, you will analyse and improve systems, methods, and mechanical equipment. You will observe procedures in operation and make recommendations for modifying them. This position will involve close liaison with Ford management at all levels.

Obviously this is very much a role for an effective communicator - a man or woman with natural organising, planning and co-ordinating abilities. An added interest will be a substantial number of trips to Spain or Germany each year to assist in launching major new systems in our European locations. An understanding of German and/or Spanish will be a distinct advantage.

We offer a salary of up to £4800 depending on your qualifications and experience and there are first class promotion prospects not just at Daventry but elsewhere within the Ford organisation. Our comprehensive fringe benefits package includes a special car purchase scheme.

Please write, giving sufficient details to make an application form unnecessary to Alan Mitchell, Supervisor Salaried Personnel & Training, Room 18/404, Ford Motor Company Limited, Royal Oakway South, Daventry, Northants NN11 5NT.

Ford leads the way

Assistant Engineer c. £4200

Scicon Computers is a U.K. based member of the International Systems Group. Our team of 250 professional staff have a broad base of experience which can be drawn upon as required to complete projects in the consultancy and computer systems markets.

To maintain our leadership status of the field leaders requires varied in-house capabilities for development of both projects and the latest methodology. This facility is currently being expanded and a vacancy now exists for a computer room Assistant Engineer.

The successful candidate will be responsible to the senior engineer for the smooth running of the computer-room facilities consisting of several mini and micro computer systems, peripherals and terminals. He/She will perform preventative maintenance, organise corrective maintenance, provision supplies of materials, consumables, assist in installations and further expansion of the facilities.

Candidates should have typically H.N.C. or Services background with experience in minicomputers and data communications. A sound engineering background is highly desirable.

Salary will be commensurate with experience and qualifications and generous fringe benefits are provided.

Please telephone or write for an application form to:

Sue Brewer
Scientific Control Systems Limited
Sanderson House
48-50 Berners Street
London W1P 4AQ
Telephone 01-580 5939

A member of the I.S.G. Group

Scicon

Programmer/Documentation Analyst

We are a large international merchant bank operating on 3 PDP 11/50's and 2 PDP 11/70's on a real time financial system.

We are seeking personnel with experience in BASIC or AIMS to join a team involved in the documentation and maintenance of existing programmes.

In addition to a good salary, we offer fringe benefits which include LV's of 50p per day, House mortgage assistance, contributory Pension Scheme and free Life Assurance cover.

Please write with career details, or telephone for an application form.

J. A. Newman, Assistant Staff Manager,
Kleinwort, Benson Ltd. 20 Fenchurch Street,
London EC3P 3PB
Telephone: 01-623 8000 Ext. 7088

KLEINWORT BENSON
Merchant Bankers

DINERS CLUB LTD. SENIOR SUPERVISOR

We are seeking a senior supervisor to be responsible for our busy D.P. Department which handles all aspects of card processing from receipt, punching, processing on a Data 100 terminal, on-line transmission, and post processing on IBM sorters and collator.

The successful applicant will have experience of Unit Record Equipment and Terminal Operations, and will be accustomed to meeting strict deadlines. He/She will be involved in our new installation based on MICR Technology which is due to come on-line within 18 months.

Supervisory experience and a business/financial background would be an advantage.

An excellent salary will be offered to the successful candidate with generous fringe benefits, including a profit sharing scheme.

Please write with details of your career to date to:

Janet Bell, Assistant Personnel Manager
DINERS CLUB LTD.
214 Oxford Street, London W.1
Tel: 01-490 3040

Puzzle answer

Let L be length of train, X the distance first tramp (A) walks in 20 seconds, and Y the distance second tramp (B) walks in 18 seconds. We know that the train travels (L+X) in 20 seconds, and (L+Y) in 18 seconds, and 30(L+X) or 100(L+Y) in 10 minutes, and 30(L+Y) or 100(L+X) in 10 minutes. Now since A walks 30X in 10 minutes, the distance separating A and B at the moment the train reaches B is 30(L+X) - 31L, or 31(9X+10Y). Finally, closing speed between A and B is clearly 9X+10Y in 180 seconds. So they will meet in 41 times 180 seconds, less the 18 seconds it took for the train to pass B. This amounts to 8554 seconds.